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THE
MANUFACTURE, CONSUMPTION
AND PRODUCTION OF
IRON, STEEL, AND COAL,
IN THE
DOMINION OF CANADA.

WITH SOME NOTES ON THE MANUFACTURE OF IRON, AND ON THE
IRON TRADE, IN OTHER COUNTRIES.

BY

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P R E F A C E .

The aim of the present work has been to bring into prominent notice the importance to the Dominion of Canada of the manufacture of Iron ; to show how this Industry would benefit our country and develop our resources.

A want of reliable information on this subject has long been felt. In the following pages an effort has been made to treat the matter from a commercial rather than from a scientific point of view : to show the conditions under which other nations have succeeded, to arrive at the value of the manufactured articles imported, and quantities consumed.

No pains have been spared in tabulating the statistics of our domestic consumption, to make the figures both useful and reliable, but in bringing together so many figures, it is difficult to avoid error, even where the greatest care is taken to prevent it.

Chapters II., III., IV., and V. have been accepted as a paper, to be read before the American Institute of Mining Engineers, at their coming meeting in Halifax, N.S.

The author has preferred, wherever it has been possible, to give direct quotations from authorities, and the obligations thus incurred are acknowledged in the text.

Special acknowledgment, however, must be made of the aid obtained from " Principles of the Manufacture of Iron and Steel, with some Notes on the Economic Conditions of their Production," by Sir Isaac Lowthian Bell, Bart., a work which is earnestly recommended to any one desirous of becoming fully informed on this subject.

In closing these remarks, the writer has pleasure in acknowledging the obligation he is under to those gentlemen who have so kindly assisted him with information, and desires particularly to mention Mr. James, M. Swank, of Philadelphia ; Mr. G. R. Van Norman, Q.C., of Brantford, Ont. ; Mr. F. C. Wurtele, of Quebec, and Messrs. Day and Carter, of Cleveland, O.

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CHAPTER I.

INTRODUCTION.

The manufacture of Iron and Steel is, in most countries, considered of National importance; and there can be no doubt that England's present advanced position in the Sisterhood of Nations, is largely attributable to the development of her Coal and Iron deposits.

The Dominion of Canada, however, which holds its own in so many other industries, which among the nations "stands third with regard to its population, as to the tonnage which it floats on every sea," which "in 1883 had 39,350 miles of telegraph and nearly 10,000 miles of Railway in operation," which has "\$104 invested in Railways for each inhabitant, being only excelled by the United Kingdom, which has \$107, and the United States, which have \$112,"¹ is behind the rest of the world in that special industry which may be regarded as the Keystone of all manufactures, failing indeed, in this particular, as respects other nations, to obtain the slightest nominal rank or recognition. In any statement of the world's production of Iron and Steel, after Great Britain, United States, Germany and Luxemburg, France, Belgium, Austria and Hungary, Russia, Sweden, Spain, Italy, are mentioned, the name of Canada never appears, but is simply supposed to be included under "other countries." There is no other country in the world with TEN THOUSAND MILES OF RAILWAY that does not make its own rails.

The subject of the manufacture of iron and steel has at various times and places been discussed, for, in the Dominion Board of Trade reports from 1871 to 1879, the question is almost annually referred to. In the Houses of Parliament, both Dominion and Local, the matter has at times created some interest, and a feeble effort has been made to assist it, but no material progress has been made.

Not only does the position of the few iron manufacturers we have steadily get worse, in fact they can hardly be said to exist, but from

¹ Speech of Sir John A. Macdonald, Toronto, Dec. 18th 1884.

its being *the most important manufacture in the late Province of Canada*, fifty to seventy-five years ago, when iron and stoves were articles of export, it has fallen off to such a point that a sort of hopeless feeling has been engendered, and a great number of people believe that we have not the facilities to enable us to manufacture iron in Canada. The actual facts of the case are that there is very little known in regard to this subject, that very few people know the difference between cast and wrought iron, and that this being essentially a wooden country there are few opportunities of seeing or hearing anything about the detailed processes of manufacture.

If it was true that Canada had not the materials out of which to make iron or steel, or had never attempted to do so, there might be some reason for the apathy which exists; not only is such not the case, but it can be proved, without fear of contradiction, *that there are few, if any, places in the world which have such natural advantages for the manufacture of iron, as we possess in Canada.* In addition to this, our annual consumption is of sufficient extent to justify the erection of works and the expenditure of capital necessary for the production of what we require, and it only remains for us to follow the example of EVERY NATION WHICH TO-DAY HAS ANY IMPORTANCE IN THIS MANUFACTURE, and make use of the advantages so bountifully provided for us by nature.

Sir William Fairbairn, in his Work entitled *Iron, its History, Properties and Processes of Manufacture*, says: ¹

"In the Mineral and Geological Department of the Exhibition of 1862 were exhibited striking specimens of iron ore from the Colonies, amongst which was the remarkable collection from Canada (*the late Province of Canada consisting of the present Provinces of Ontario and Quebec*), consisting of oxide, red hematite, and bog ore. The thickness of some of the beds from which the specimens were taken is worthy of notice. . . . The great drawback to (*the late Province of*) Canada is the absence of coal, which necessitates the ore being sent to some distance to be smelted, and were it not for this drawback, Canada would rank foremost as an iron-producing country. In Nova Scotia, some of the richest ores yet discovered occur in boundless abundance. The iron manufactured from them is of the very best quality, and is equal to the finest Swedish metal."

Prof. A. R. C. Selwyn, F.R.S., Director of the Geological Survey of Canada, in writing of the iron ores of Ontario, says:

"The iron ores of Ontario belong to the Laurentian and Huronian

¹ Page 34.

systems, and are associated with gneiss and crystalline limestone. They correspond with the ores which occur in the same systems in northern New York and in the highlands of southern New York and New Jersey, where they have been long mined on an extensive scale. The Swedish iron, which is famous throughout the markets of the world, is made from similar ores, which occur there in rocks of the same age. The ore is chiefly magnetic oxide, but often mixed with hematite, and contains from 50 to 64 per cent. of metallic iron. The beds or veins vary in thickness from one foot to 200 feet, and there is practically no limit to the quantity of these ores which could be mined."¹

Sir William Dawson, in 1875, in writing on the subject of "The Iron and Coal of Nova Scotia, a Source of Wealth to the Dominion," says:—"It is a remark often made that the iron ores of Canada, rich and magnificent though they are, suffer in their practical value on account of their distance from the mineral fuel required, in so great a quantity, whenever smelting processes are undertaken on a large scale. To a certain extent, better means of communication and larger and more economical working must remove this disadvantage. It should, however, be borne in mind that the great iron deposits of Nova Scotia, equal in extent and value to any others in the Dominion, are not so situated, but lie in close proximity to some of the greatest coal fields in the world. We need only glance at the Report of the Geological Survey of Canada for 1873-4, of which more than 100 pages are occupied with these great and important deposits, to see that this is the fact. Even in Great Britain itself, their two great staples of mineral wealth are not in more enviable contiguity, and the iron ores of Great Britain are in general neither so rich nor so accessible as those of Nova Scotia. This is more especially the case with the magnificent deposits of the Acadia Mines in the Cobequid Mountains, and with the still more extensive beds and veins of the county of Pictou. Both of these may be expected greatly to advance the general prosperity of the Dominion. The veins at the Acadia Mines have been worked on a limited scale for some years, and have afforded the iron of which Sir William Fairbairn has written in his History of Iron:—"In Nova Scotia, some of the richest ores yet discovered occur in exhaustless abundance. The iron manufactured from them is of the very best quality, and is equal to the finest Swedish metal. Several specimens have been submitted to direct experiment, and the results prove the

¹ Stanford's North America. London, 1883, page 505.

high powers of resistance to strain, durability and adaptation to all those processes by which the finest description of iron and steel are manufactured.' Active preparations are now in progress to work these ores more extensively, and they may be said fairly to have taken their place in the markets of the world.

"The iron ores of Pictou have been less fortunate. The principal reason for this is, that while the region traversed by the Cobequid ores was free of reservation of minerals to the Crown, the Pictou district was very long locked up by the monopoly of the General Mining Association, who, after one feeble effort in the manufacture of iron, were deterred probably by the difficulties and losses attending their colliery operations from further attempts. This disadvantage has now been removed, and a successful effort has been made to combine the interests of several distinct mining areas, held by separate parties, so that immediate progress is now rendered possible. As these ores are less known than those above referred to, and have been largely illustrated by the labours of Dr. Harrington and others, detailed in the recent report of the survey, a more particular notice may be given of them as an example of the vast wealth now waiting to be made available so soon as the iron trade shall revive from its present depression.

"The Pictou deposits consist of both beds and veins. Of the former class the most remarkable is a great bed of red hematite, unexampled elsewhere in Nova Scotia. It is capable of yielding 45 per cent. of iron, and is included in the Silurian slates. Its geological position being somewhat newer than that of the Lower Silurian, Huronian and Laurentian ores of the United States and Canada proper, and older than the ores of Nictaux in western Nova Scotia and those of the great Carboniferous formation in Pennsylvania. This bed, which crops out in many places on the hills in such a manner that it can be quarried like limestone or sandstone, has a thickness of from ten to thirty feet and an extension practically unlimited in the direction of the dip, and has been traced over several miles of country. The quantity of ore in this great bed and within accessible distance of the surface can be estimated only by millions of tons.

"In the immediate vicinity of this great bed, lie two large vein formed deposits, containing ores of much greater richness. One is a vein of Limonite or Brown Hematite, which is capable of yielding 62 to 63 per cent of metal; the other is a still richer crystalline specular ore yielding 69 per cent. of iron. These deposits are both of large dimensions and have been traced for several miles. They are readily accessible to mining operations. Still further—there is within reach

by rail, a bed of that rich and pure spathic iron ore, which is so highly valued wherever it can be obtained, as a source of the purer varieties of iron.

"All these ores lie in an accessible and settled country near to the Pictou and Halifax Railway, and in a short time they are likely to have by the Eastern Extension Railway, a still more direct connection with the Atlantic.

"They are at a distance of only ten to fifteen miles from some of the largest Collieries in British America. Collieries at which large quantities of coal, well fitted for the manufacture of coke, have been dumped into Railway lines embankments, or burned to get rid of them; because the only available market at present is a foreign one, to which only the larger lump coals can be sent. The collieries are thus comparatively unproductive to their proprietors, and their export of coal is depriving the country of one of its most valuable raw-materials, while the means of developing the greatest and most productive industries lie close at hand. The causes which have led to this neglect, and the prospects which exist of better things, may claim more notice at a future time."

In order to understand and appreciate the position of affairs at the present time, it will be necessary to look very briefly into the history of the manufacture in Canada, and to show the attempts made to develop it; and then, to find out our annual consumption; after doing so, it will perhaps be well to consider very broadly the main differences between iron and steel, to give an outline of the improvements in the processes of their manufacture, and to show by what means other countries have succeeded in these important industries.

CHAPTER II

THE MANUFACTURE OF IRON IN THE PROVINCE OF QUEBEC.

THE FIRST IRON WORKS IN CANADA.

THE ST. MAURICE FORGES.

The deposits of Iron Ore in the St. Maurice district, in the rear of Three Rivers, were probably known to the Indians and Jesuits, but it is not till 1667 that any discovery is reported. The affairs of the colony were then in the control of the "West India Company," who amongst other monopolies had a right to all mines and minerals.¹ Specimens of the iron ore were examined in Quebec in 1668 by the Sieur la Potardière, who reported unfavorably on them.

In 1671, Louis de Buade, Comte de Frontenac, was appointed governor of La Nouvelle France and in the original manuscripts relating to his administration, some allusion is occasionally found, to the St. Maurice iron mines.² In a letter to the Imperial Government dated 2nd November, 1672, he says :—

"The iron mine of which I have already spoken is of great consequence. I have visited it myself, in order that I may be enabled to give a more accurate account of its nature. I am gratified to learn that another mine has been discovered in Champlain, which is much richer than the Cap de la Madelaine mine, and the ore is in greater abundance. I apprehend that it will be next to impossible to exhaust this mine, as there is an extent of country of four leagues in length from Cap de la Madelaine to Champlain, which is covered with iron ore; all the streams indicate its existence. I had the curiosity to taste the water, and I found it all strongly impregnated with rust and iron,

¹ Smith's Canada, 1851—vol. 1 p. xlvii.

² British and Canadian Review, by Macaulay.

but the miners whom I sent there render the affair certain ; they are now working there and if you have any intention of establishing forges and a foundry, you may be certain that the material will not be wanting. There are six piles of ore, now lying at Cap de la Madeleine which, according to the annexed report of the miner, would last for two castings a day for four months. The important question is the placing of the forges. According to my opinion I should prefer building them on Ruisseau Pepin, which is in Champlain, rather than at the Cape where the Jesuit fathers have a mill already in operation. By thus placing the forges they would be between the two mines, and the material could be more easily conveyed from both to the central establishment. When you have decided upon establishing the said forges, as the workmen you will send out will be competent men, they perhaps can decide whether there is enough water in the stream I have above mentioned to work the wheel of the projected forges, also to judge whether it would not be practicable to bring in other streams in the neighborhood, such as Ruisseau d'Hertel, to increase the quantity of water. The chief miner, who is now here, assures me that this can be easily and successfully done. It is certain that if the forges are once established many advantages will result to the colony ; excellent iron will be manufactured there, and the consumption of fuel will help materially in the clearing of the forest land. Moreover many men will be employed at the work and a market will thus be afforded for the surplus provisions which we have at our disposal."

The "West India Company" surrendered its charter in 1675 and on the 4th of August, 1676, the first deed in connection with the forges appears, as the original concession of the Seigneurie of St. Maurice was made on that date to Dame Jeanne Jalope, widow of Maurice Poulin, Sieur de la Fontaine, King's Attorney for Three Rivers, by the Intendant, M. Talon.

On the 19th January, 1683, Dame Jalope gave the property to her son, Michel Poulin, but the other children evidently had some claims upon it, as on the 30th of April, 1683, there is a discharge recorded from Jean Baptiste Poulin de Corval, one of the brothers, and on the 20th November, 1690, a discharge was registered from François le Maître de la Movill, who married a sister.

In 1681, an extract from a letter, by the Count de Frontenac, reads as follows :—

"I am convinced that there is a very fine iron mine in the vicinity of Three Rivers, where a forge could be profitably worked. I wish I

had a man here who could plan the construction of an establishment of that kind; it would be of great use to His Majesty the King and to the whole colony. Monsieur Vallon can inform you, my lord, how Mons. de Colbert has tested the quality of the ore and with favourable results. I have sent a small quantity to Mons. Arnoul, who can give you an account of it. There is a large stream in the vicinity of this mine."

In 1685 the Marquis of Denonville was appointed Governor, and on the 18th of November, the following year, in a despatch to the Imperial Government of France, he says:--

"I have this year again had the iron mine near Three Rivers thoroughly examined. I am convinced that there is a much larger quantity of that metal than the colony requires. The great desideratum is the discovery of a stream or water power, which can be used in winter, and it is in this respect that we require an able experienced man, who could see what could be done for the establishment. Last year I sent a sample of this iron to France, and the iron workers, who found it of good quality and percentage, wish to have fifteen or twenty bariques to give it a thorough trial as to quality; it would be well to satisfy them on this point next year. If our Northern Company should succeed there would be no difficulty in accomplishing this desirable object."

On the 4th of April, 1725, Pierre Poulin made "Foi and Hommage"¹ in the castle of St. Louis in Quebec for himself, and also on his brothers account, for the *fief* and *seigneurie* of St. Maurice and on the following day "L'aveu and Denombrement" of the seigneurie was made.

The mining rights and minerals do not seem to have been granted with the land, for King Louis XIV on March 22nd, 1730, granted a license to a M. Francheville to work the mines, and a partnership was entered into by him with Peter Poulin, Gamelin and Cugnet, for this purpose, the deed of partnership being dated the 16th of June, 1733. It seems probable that a forge was now built, but the enterprise did not prove a success; the principal, Francheville, having died, his widow and the others partners on the 23rd of October, 1735, surrendered their rights to the Crown.

The iron ore was a bog ore, the deposits being on the surface, or only a few inches below the soil, so that the work of collecting the

¹ See Parkman's "Old Regime" p. 246, also Lemoine's "Quebec past and present," p. 121, for description of "Foi and Hommage."

ore was more digging than mining, and it was necessary to have access to a considerable area of land. We find that on the 15th of October, 1736, Poulin, Louise de Boulanger his wife, and Michel Poulin his brother, a priest, sold the *fief* and *seigneurie* St. Maurice, to François Etienne Cugnet, Pierre François Taschereau, Olivier de Vezain, Jacques Simonet, and Ignace Gamelin for 6,000 livres, with no terms, so long as they paid 300 livres a year.

The partners above named were called Cugnet & Cie., or "La Compagnie des Forges," and the King of France, now Louis XV, by an order-in-council dated April 22nd, 1737, empowered them to erect iron works and for this purpose advanced them 100,000 livres and claimed no rents or dues. They accordingly in that year built a blast furnace, and on the 12th of September obtained a concession of some more land called the *fief* St. Etienne from M. Hocquart who was Intendant at that time. In two years time, a French artisan was procured who improved the works and methods of working; but it was all in vain, a want of capital being said to have been the cause of failure. The Company could not carry on the works, but had to give them up, and, on the 1st of May, 1743, the Crown took possession, whereon they were worked on the King's account and in his name.

"Skilled workmen were sent out from France, who rebuilt, in part at least, the blast furnace as it now stands, and erected a Walloon hearth which is still in use for refining."¹ Extensions and additions were made, and the place, in six years time, had assumed very considerable proportions as the following account will show.

On August 3rd, 1749, Professor Peter Kalm, Professor of Economy in the University of Abo in Swedish Finland, and member of the Swedish Royal Academy of Sciences, stopped at Three Rivers, in his travels through the country, for the special purpose of seeing the iron works. He thus describes his visit :—²

AUGUST 3rd, 1749.

"Whilst my company was resting, I went on horseback to view the iron work. The country which I passed through was pretty high, sandy and generally flat. I saw neither stones nor mountains here. The iron work, which is the only one in this country, lies three miles to the west of Trois Rivières. Here are two great forges, besides two lesser ones, to each of the great ones and under the same roof with

¹ Dr. T. Sterry Hunt in Swank's "Iron in all Ages," 1884.

² Travels into North America by Peter Kalm, London, 1771. Vol. III, p. 87.

them. The bellows were made of wood, and everything else, as it is in Swedish forges. The melting ovens stand close to the forges and are the same as ours. The ore is got two French miles and a half from the iron works and is carried thither on sledges. It is a kind of moor ore, which lies in veins within six inches or a foot from the surface of the ground. Each vein is from six to eighteen inches deep, and below is a white sand. The veins are surrounded with this sand on both sides, and covered on the top with a thin mould. The ore is pretty rich and lies in loose lumps in the veins, of the size of two fists, though there are a few which are near eighteen inches thick. These lumps are full of holes which are full of ochre. The ore is so soft that it may be crushed betwixt the fingers. They make use of a grey limestone which is broke in the neighborhood for promoting the fusibility of the ore; to this purpose they likewise employ a clay marl, which is found near this place. Charcoals are to be had in great abundance here, because all the country round this place is covered with woods, which have never been stirred. The charcoal from evergreen trees, that is, from the fir kind, are best for the forge, but those of deciduous trees are best for the smelting oven. The iron which is here made is described to me as soft, pliable and tough, and is said to have the quality of not being attacked by rust so easily as other iron; and in this point there appears a great difference between the Spanish iron and this in ship-building. This iron work was first founded in 1737 by private persons, who afterwards ceded it to the King; they cast cannons and mortars here of different sizes, iron stoves which are in use all over Canada, kettles, &c., not to mention the bars which are made here. They have likewise tried to make steel here, but cannot bring it to any great perfection, because they are unacquainted with the best manner of preparing it. Here are many officers and overseers, who have very good houses built on purpose for them. It is agreed on all hands that the revenues of the iron work do not pay the expenses, which the King must every year be at in maintaining it. They lay the fault on the bad state of population, and say that the few inhabitants in the country have enough to do with agriculture, and that it therefore costs great trouble and large sums to get a sufficient number of workmen. But, however plausible this may appear, yet it is surprising that the King should be a loser in carrying on this work, for the ore is easily broken, very near the iron work and very fusible. The iron is good and can be very conveniently dispersed over the country. This is, moreover, the only iron work in the country, from which everybody must supply himself with iron tools, and

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what other iron he wants. But the officers and servants belonging to the iron work appear to be in very affluent circumstances. A river runs down from the iron work into the river St. Lawrence by which all the iron can be sent in boats through the country at a low rate. In the evening I returned again to Trois Rivières."

There evidently was very good ground for Kalm's suspicions, as the peculations of the Governor, Intendant and principal officials were at this time notorious, and "complaint after complaint was despatched to France touching the ruinous state of things they were fast producing in the Province."¹

The Governor, the Marquis de la Jonquière, was re-called, but died in Quebec in May, 1752. In that year an inspector, M. Franquet, was sent to visit the different posts in La Nouvelle France, and the following is a translation of a portion of a French manuscript account of his visit to the forges :—²

"M. Bigot, Intendant of New France, who resides at Quebec, had recommended me to visit the St. Maurice forges, as the establishment was extensive, and as he had no doubt that I would be pleased to be in a position to give an account of it. By stopping at Three Rivers, I could reach the forges in two hours, so having settled upon that course, I requested M. Rigaud, who was then in charge of that post, to accompany me. We left Three Rivers at five o'clock a.m., with M. Tonnancour and other friends, whom M. Rouville, director of the forges, had invited to accompany us. In leaving the town, we ascended a hill covered with sand, crossed a plain and passed through a wood of stunted trees, on emerging from which we stood on a hill overlooking a valley, in which the said forges of the King are situated; we crossed a wooden bridge built over a small stream, and disembarked from our conveyance at the door of the Director's dwelling. After the first ceremony of reception by the Director, his wife, and the other employées, we proceeded to visit the works. The stream which drives the machinery is dammed up in three places; the first dam drives the wheel for the furnace, the second and third each a trip-hammer. Each dam has a water pass to prevent overflow in high water; it is supposed that the stream or water power is sufficiently strong to drive two other hammers. The buildings of the post are irregularly situated on the banks of a stream, and little or no taste seems to have been displayed in placing them. The principal build-

¹ McMullin's Canada, 1855, p. 106.

² Macaulay in British and Canadian Review.

ing is the Director's residence, a very large establishment, but scarcely large enough for the number of employés who have to be accommodated.

"On entering the forge, I was received with a customary ceremony; the workmen moulded a pig of iron about fifteen feet long, for my special benefit. The process is very simple, it is done by plunging a large ladle into the liquid boiling ore and emptying the material into a gutter made in the sand. After this ceremony I was shown the process of stove moulding, which is a very simple affair but rather an intricate operation; each stove is in six pieces, which are separately moulded, they are (afterwards) fitted into each other, and form a stove about three feet high. I then visited the shed where the workmen were moulding pots, kettles and other hollowware. On leaving this part of the forge we were taken to the hammer forges, where bar iron of every kind is hammered out. In each department of the forges, the workmen observed the old ceremony of brushing a strangers' boots; in return they expect some money to buy liquor to drink to the visitor's health. This establishment is very extensive, employing upwards of 180 men. Nothing is consumed in the furnace but charcoal, which is made in the immediate vicinity of the post. The ore is rich, good and tolerably clean; it formerly was found on the spot, now the Director has to send some distance for it. The management of these forges is economical. It must be readily understood that owing to the numerous branches in which expenditure must be incurred, unless a competent man be at the head of affairs, many abuses would be the consequence. Among other employés, His Majesty the King supports a Recollet Father at this establishment with the title of Aumonier. This iron is preferred to the Spanish iron and is sold off at the King's stores in Quebec at the rate of from 25 to 30 castors (beaver skins) per hundred weight. In order to obtain a better knowledge of the position of these works, I would refer to the notes sent to the Court of France on this subject, wherein will be found all details of their management. I may say, however, in conclusion, that they are unprofitable to the King, and I am assured that if they were offered on lease at public sale, one hundred pistoles per annum might be procured for them. After a splendid dinner at M. de Rouville's mansion, we returned to Three Rivers highly pleased with our visit, and took supper at M. de Tonnancour's. The distance from the town to the forges is nine miles."¹

¹ Taken from the British and Canadian Review, Vol. I., No. 2, January, 1863, by M. Macauley.

It would appear as if the forges produced more iron than the colony could consume, and that, although some was exported to France, the authorities there would not be convinced that it was fit for fire-arms: so it was proposed to form a naval establishment in Canada and make use of this Canadian iron in shipbuilding. Orders were accordingly given for erecting docks at Quebec for building men-of-war, but nothing was in effect accomplished.¹

We next hear of these forges in the articles of capitulation between their Excellencies Major General Amherst, Commander in Chief of His Britannic Majesty's troops and forces in North America, on the one part, and the Marquis de Vaudreuil, &c., Governor and Lieutenant General for the King in Canada, on the other, on the 8th of Sept., 1760.

ARTICLE XLIV.

"The papers of the Intendancy, of the officers of Comptroller of the Marine of the ancient and new treasurers of the King's magazines, of the offices of the revenue, and *forges of St. Maurice*, shall remain in the power of M. Bigot, the Intendant, and shall be embarked for France in the same vessel with him; these papers shall not be examined."

The Intendant arrived safely in France, but was at once seized and imprisoned, and made to disgorge most of his ill-gotten gains.²

The forges and all pertaining to them now passed into the hands of the British Crown, and, although for some years there are no records, there is no doubt that they were worked.

In 1767 the Crown, which was represented at that time by Governor Murray, leased the tract of land and works for sixteen years, from the 19th of June, to Christophe Pellisier, Alexandre Dumas, Thomas Dunn, Benjamin Price, Colin Drummond, Dumas St. Martin, George Alsopp, James Johnson and Brook Watson, at a rental of £25 currency per annum. In 1775 the American invasion occurred, when it appears that Pellisier helped the invaders with both goods and money and went to see them at Holland House, near Quebec; he also cast shot and shell for them to be used in the siege of Quebec, and finally, the night before the battle of Point du Lac, where the invaders were beaten by the English under General Carlton, he ran off to Sorel and the United States, taking with him all the funds, as also the vouchers for the

¹ History of America by Wm. Russell, of Gray's Inn. Book iv, p. 372, London, 1778.

² Parkman's "Montealm and Wolfe."

money advanced to the Americans, about £2,000, got them cashed and sailed for France. This crippled the company, but, by dint of hard work, they managed to recover and continued operations till the expiration of their lease.¹

On the 10th June, 1783, Conrad Gagy was the new lessee, and his term was for sixteen years at £18 15 sterling per year. He sold the balance of his lease on the 10th of March, 1787, to Alexander Davidson and John Lees for the sum of £2,300 currency. This partnership was subsequently dissolved, as on the 6th of June, 1793, Alexander Davidson sold the balance of his lease to George Davidson, David Munro and Matthew Bell for £1,500 currency. Their term expired in 1799, but, on the 30th of May in that year, they were granted an extension to the 1st April, 1801, at the same rental.

A new arrangement was now made, Munro & Bell entering into a five years lease and paying an annual rental of £850 sterling. This lapsed in 1806, but they continued to hold it on sufferance till the 1st of January, 1810, when they secured a lease for 21 years, at £500 per annum.

At this time the manufacture of iron was the most important industry in Canada,² there existing then a considerable export of cast iron articles, particularly of stoves.

From year to year the place had grown. The following account gives an idea of what it was: "The establishment is furnished with every convenience necessary to . . . extensive concern, the furnaces, the forges, the founderies, workshops, &c., with houses and other buildings, present the appearance of a tolerably sized village. The principal articles manufactured are stoves of all kinds used in the province, large potash kettles, machines for mills, and various kinds of cast and wrought iron, also a great quantity of pig and bar iron for exportation. The number of men employed is from 250 to 300. The overseers and persons employed in the construction of models are English and Scotch, the workmen are generally Canadians."³

The inhabitants in the District now began to complain that so much land was leased to the forges that "the town of Three Rivers was hemmed in at the back," and that people who desired to settle in that neighborhood could not obtain any land; this irritation was further increased, "by a proclamation, the lessees induced Lord Dal-

¹ F. C. Wurtele.

² Letters from Canada, Hugh Gray, London, p. 22, 1809.

³ Bouchette's Lower Canada, 1832. St. Maurice.

house (Governor from 1820 to 1828) to issue, prohibiting even the making of maple sugar on the land in question. This had been an immemorial source of advantage to the inhabitants around; in the season from 300,000 to 500,000 pounds were made each year. Even the pretence of destruction to the fuel could not be made for this, as tapping the trees did not destroy them for wood."

The Honorable Matthew Bell, Seigneur of St. Maurice, was a man of great importance; he lived in princely style in his chateau at the forges, where he kept a stud of horses and a pack of fox hounds, and when his lease expired on the 31st of March, 1831, he was able to get it renewed by orders-in-council from year to year till 1846. He died shortly afterwards, and at the time of his death was in very reduced circumstances, being insolvent before he gave up the forges.

The Crown now resolved to sell the property and it was bought at auction by Henry Stuart, Advocate, of Montreal, on August 4th, 1846, and was leased by him to James Ferrier, of Montreal, who worked it for some years.¹ Henry Stuart finally sold his interest to Andrew Stuart and John Porter, of Quebec, who abandoned it in 1859, as it did not pay.

It appears that when Henry Stuart purchased the property, he paid very little, if anything, on it, and the balance of the purchase money not being paid when due, the Crown obtained a judgment against him and seized the property which was sold by the sheriff on the 22nd October, 1861. "The forges not bringing the value set upon them by the Crown were acquired by them for \$7,200."² and sold (together with a farm attached, but without any more land) the following year to Monsieur Heroux, of St. Barnabé, for \$7,000, who in his turn sold the forges, retaining the farm, to John McDougall of Montreal, for £1,700 currency. This price included the furnaces, works, house, cottages, water privileges, &c. All the land formerly pertaining to the forges was sold to the squatters and settlers who supplied ore and wood to the works, which were now once more resumed. Their product, however, was chiefly used in the manufacture of car wheels, and so the trade in stoves and hollowware gradually fell off.

The property is now owned by George McDougall, of Three Rivers,

¹ The Hon. James Ferrier informs me that he occupied and worked the forges for four years, from 1847 to 1851.

² Extract from report of Commissioner of Crown Lands, 1861. I am indebted for this information to Mr. J. T. Judah, of Montreal, late Superintendent of Crown Domain and Jesuits' estate, Department of Crown Lands.

the furnace having been in blast till the summer of 1883, when, owing to the ore and fuel becoming exhausted, it was finally closed. When working, it was *the oldest active blast furnace on the American continent.*

This statement is made upon the authority of Mr. James M. Swank, late Secretary and now Vice-President and General Manager of the American Iron and Steel Association; a short account is given of the Works in his "Statistics of the Iron and Steel Production of the United States," which he, as special agent, compiled in 1880, for the Tenth Census of the United States; and more recently in his "History of the Manufacture of Iron in all Ages," published last year, wherein Mr. A. T. Freed, of Hamilton, Ont., and Dr. T. Sterry Hunt, of Montreal, are acknowledged as having contributed most of the information, as respects these forges.

Through the kindness of Mr. F. C. Wurtele, Librarian of the Quebec Literary and Historical Society and also of Mr. H. M. Price, of Quebec, I have been enabled to give fuller particulars than are furnished by Mr. Swank. In addition to those thus named, other authors and authorities, have been carefully consulted in my endeavour to give a complete account of "The Saint Maurice Forges," from their rise to their close, for they are unique in the history of this country.

IRON WORKS AT BATISCAN.

About the year 1798, a blast furnace and casting house, two forges, a saw and grist mill, besides other workshops and dwelling houses were built, on the east side of the Batiscan river, about six miles from its mouth. The works were situated in the seigneurie of Batiscan, County of Champlain, were in operation some little time and were similar to those at St. Maurice; but the proprietor died and the place was shut up. Both ore and wood are reported to have been more plentiful here than at St. Maurice.¹

An interval of sixty years now occurs before we again hear of a new enterprise.

THE RADNOR FORGES.

The Radnor forges at Fermont in the seigneurie of Cap de la Madeleine, County of Champlain, are situated about ten miles from

¹ Bouchette's Lower Canada, 1832.

Three Rivers, on the Piles Branch of the North Shore Railway, and were erected about 1860, by Messrs. Larue & Co.,¹ the firm consisting of Larue, Turcotte and G. B. Hall & Co. The establishment was extensive, consisting of a blast furnace, forge and large rolling mill; a car wheel foundry in Three Rivers, 40,000 acres of freehold land (timber and ore lands) also forming a part of the property. Sir William Logan, in his *Geology of Canada*, 1863, says: "The crude ore is brought to the furnace partly by the workmen of the company and partly by the farmers on whose land it is found. It is washed to free it from adhering earth, and then yields from forty to fifty per cent. of metal; about 2,000 tons of cast iron being now produced annually from between 4,000 and 5,000 tons of ore. The number of men employed at the Radnor Forges varies from 200 to 400, a great many hands being required at certain seasons to dig up and bring in the ore, and to prepare and transport the charcoal.

"The chief manufacture of the company has, of late, been cast-iron wheels for railway cars, for which the metal appears well adapted. A pair of car wheels, which were said to have run 150,000 miles, with an axle, of this manufacture, were sent by Messrs. Larue & Co., the proprietors of the forges, to the International Exhibition of 1862. Wrought iron is also made at this establishment, and a rolling mill has recently been erected here, which furnishes iron for the manufacture of scythes and nail rod iron."

The rolling mill and forges, &c., have since been destroyed by fire, and at present the blast furnace is in operation, turning out about four tons of iron per day. The ore is dredged up from the bottom of Lake Tortue, delivered on railway cars and carried direct to the furnace, whilst the iron is still used for car wheels in the wheel foundry at Three Rivers, now leased to Mr. George McDougall. Over a million dollars have been sunk in these works since their commencement, through bad management and disastrous fire.

L'ISLET BLAST FURNACE.

This furnace was built by the Messrs. McDougall, the proprietors of the St. Maurice Forges, about four miles from those works,² but it has not been in operation for some years.

¹ Geo. Survey, 1863.

² Geo. Survey, 1873-74.

IRON WORKS AT HULL.

In 1867 the "Canada Iron Mining and Manufacturing Company," of Montreal, built a blast furnace at Hull, near Ottawa, and, for a time, in that and the following year produced a superior quality of pig iron, but "the economic results not being satisfactory" the working was stopped, and the furnace, being much injured by a forest fire a few years afterwards, was abandoned.¹

SMELTING IN YAMASKA.

The "St. Francis River Mining Company" in 1869 erected a blast furnace in the County of Yamaska, near the Rivière aux Vaches, and kept it working until 1873, producing in that time 5,520 tons of charcoal pig iron. The property was purchased in that year by Messrs. John McDougall & Co., of Montreal,² and operated by them till 1880, when the bog ores having been exhausted within a paying distance from the furnace, it was dismantled.

BAIE ST. PAUL IRON WORKS.

Two blast furnaces, extensive buildings and a railway from the works to the river were completed in 1873 by the "Canadian Titanic Iron Company" near Baie St. Paul, on the North Shore of the St. Lawrence, about sixty miles below Quebec, for the purpose of smelting the titaniferous iron ore of that region. The furnaces were only in operation a short time, the cost of production being too great. The place was never worked again, and was dismantled in 1880.

GRANTHAM IRON WORKS.

Messrs. John Macdougall & Co., of Montreal, in 1880 and 1881 built two blast furnaces at Drummondville, on the River St. Francis, in the Township of Grantham, County of Drummond. They are still in active operation and are known as the Grantham Iron Works. The resident manager, Mr. Robert Macdougall, has kindly furnished the following particulars: "The blast furnaces are each thirty-four feet high, with boshes of eight and ten feet respectively, they are worked with hot and cold blast, and the air pumps are driven by

¹ Geo. Survey, 1866-9, 1873-4.

² Geo. Survey, 1873-4.

³ Geo. Survey, 1873-4.

water power from the River St. Francis. The fuel used is charcoal, and the bog ore which contains about 40 to 45 per cent. of iron is obtained about three miles from the works. The annual capacity is 4,000 tons, and the product charcoal pig iron for car wheel purposes."

A siding from the South Eastern Railway runs directly into the works, and the iron is made into car wheels at the foundry in Montreal.

MOISIC IRON WORKS.

The "Moisic Iron Company" was originated in 1867 to work the iron sands on the North shore of the Gulf of St. Lawrence.

Dr. Sterry Hunt, in his "Notes on Iron and Iron Ores" in the Geological Survey Report of 1866-69, says:—

"The great deposits of black iron sand on the beach near the mouth of the Moisic river having attracted attention, various attempts to reduce it were made. In January, 1867, Mr. W. M. Molson, of Montreal, had the ore successfully treated by the bloomary process, in northern New York, and the result proving satisfactory, several bloomary furnaces were, in 1867, erected by him at Moisic, and have since been in successful operation."

A forge and rolling mill were subsequently erected in Montreal to work up the loops or blooms, which were made into forgings, &c., and also exported to the United States.

I am indebted to Mr. James M. Swank for the following, which is a copy of a leading article from the "Bulletin," a weekly paper published by the "American Iron and Steel Association," at Philadelphia, issue of May 4th, 1875:—

MOISIC IRON.

"A recent Treasury decision revives interest in a subject which well illustrates the necessity of constant vigilance by the iron manufacturers of the country in guarding their interests from hostile influences. On the 17th March, the secretary of the Treasury decided that the Collector of Customs at Ogdensburg, New York, was right in assessing a duty of one and a half cents per pound, less ten per cent., on certain Moisic iron blooms imported from Canada, March 2nd, and refusing to allow them to be entered as pig iron at \$7.00 a ton, less ten per cent. The Secretary said:—

"The 6th section of the act of February 7th, 1875, having placed Moisie iron in the same category for assessment of duty as all other iron, the only question to be determined in this case is, whether the said iron is more advanced than pig iron. On this question it appears that the iron is not known by the designation of iron in pigs, but is invoiced and is commonly known, bought and sold as iron in blooms (a stage of manufacture in advance of pig iron), and therefore is liable to duty at the rate prescribed for "iron in bars" as assessed under the provisions in 'Schedule E,' which is as follows: 'But all iron in slabs, blooms, loops, or other forms less finished than iron in bars, and more advanced than pig iron, except castings, shall be rated as iron in bars and pay duty accordingly.'"

Moisie iron is made in Canada on the north shore of the Gulf of St. Lawrence, from a fine black sand, lying about three feet below the ordinary beach sand, and containing over 63 per cent. of metallic iron. A forge, with eight fires, converts this ore into a very fine quality of iron blooms, which are equal to the best Swedish and Russian charcoal bar and hammered iron for the manufacture of the best cast steel, and come into direct competition in our market with the product of our Lake Champlain forges and other steel irons. The blandness which could demand that these Moisie blooms should be admitted into our ports as *pig iron* is most remarkable, but it is thrown completely in the shade by the innocence of a member of Congress, who, not very long ago, standing on the floor of the House of Representatives held up in his hands the ragged end of one of these blooms and stated that it was only so much pig iron—that is iron in a primary stage of manufacture, and was therefore entitled to pay duty as pig iron and not as a more advanced product. At the time this statement was made the iron in question was worth twice the value of the best imported pig iron.

The tactics which represented Moisie iron to be pig iron were so far successful as to induce Congress by the Act of 6th June, 1872, to fix the duty at \$15.00 a ton, which was less than half the duty of one and a half cents per pound, less ten per cent. imposed on iron of similar quality imported from Sweden and Norway. But this concession did not satisfy the parties interested in the manufacture of Moisie iron, and accordingly, in the winter of 1873-4, they asked Congress to reduce the duty to \$6.30 a ton, the amount then levied on pig iron. Nothing was done in the way of tariff revision at that session, but in January last Congress passed, and on February 7th the President approved, an act known as the "Little Tariff Bill," the 6th section of which reads as follows:—

"That section four of the act entitled, 'An Act to reduce duties on imports, and to reduce internal taxes and for other purposes,' approved June 6th, 1872, be and the same is hereby amended by striking out the thirtieth paragraph of said section in relation to the duty on Moisie iron, and from and after the passage of this act, the duty on Moisie iron, of whatever condition, grade or stage of manufacture, shall be the same as on all other species of iron of like condition, grade or stage of manufacture."

To the mind of the Moisie iron manufacturer this section placed his blooms in the same class as pig iron, paying \$7.00 a ton less ten per cent., but to the mind of the Secretary of the Treasury, it placed the blooms in the same class with iron in bars, paying one and a half cents a pound, or \$33.60 a ton (2,000 pounds) less ten per cent. Quite a difference.

Between the date of the approved "Little Tariff Bill" (February 7th) and the approval of the "tax and tariff bill" (March 3rd) the above duties \$7.00 and \$33.60, respectively, less ten per cent., were in force. By the terms of the last named act, the ten per cent reduction was abolished. This explanation accounts for the fact that the Collector of Customs at Ogdensburg was asked to assess a duty of \$7.00 a ton less ten per cent. on Moisie iron imported March 2nd, and was sustained in his decision to assess a duty of one and a half cents a pound, less ten per cent. The duty on this iron since March 3rd is one and a half cents a pound."

The proprietor having lost a large amount of money was obliged to close both the works at Moisie and those in Montreal, and they were dismantled and sold in 1876 or the following year. The action of Congress, no doubt, which prevented the export of the blooms to the United States deprived him of the only market there was, for that class of iron, and the outlet for his product being closed, he could not continue.

QUEBEC STEEL WORKS.

An attempt was made in Quebec to work these sands. Mr. B. J. Harrington, B.A., Ph. D., in his "Notes on the Iron Ores of Canada and their Development," in the Geological Survey Report of progress for the year 1873-4, thus describes it:—

"MANUFACTURE OF STEEL AT QUEBEC.—In the month of June last, I had an opportunity of visiting the steel works erected at Quebec for the purpose of manufacturing steel directly from the purified sands

of the Gulf. Since the death of Mr. Labreche Viger, the works have passed into the hands of a new company, the president of which is Mr. Chinic, hardware merchant of Quebec. The enterprise, so far as I could learn, has not been successful, and at the time of my visit nothing whatever was being done. The furnace is a well constructed Siemens regenerative furnace, with five gas producers, and, except in the construction of the hearth, which is perfectly flat, and in one or two other minor details, resembles the one employed by the Messrs. Cooper & Hewitt at Trenton, N. J., in the manufacture of steel according to the Siemens-Martin process.

In making steel, the sand, which had been purified by Dr. LaRue's magnetic machine, was mixed with tar and charcoal powder in a box containing revolving knives or beaters, and the mixture was then pressed into square blocks by means of a hydraulic press. The blocks were then piled upon the furnace hearth and melted down to steel, which was finally tapped off into ingots containing about 200 pounds.

The cause of failure I was not told, but difficulty was probably experienced in obtaining a regular and homogeneous product."

Mr. Chinic subsequently stated "That further and rather more successful experiments have lately been made with the furnace, and ten or twelve tons of steel produced. A good deal of difficulty was experienced in pouring and the ingots were frequently *honey-combed*, and after forging were liable to contain flaws. Not more than 500 pounds of steel were produced at a melting, which required six hours." Nothing more was done and the works were abandoned.

HAYCOCK IRON WORKS.

In the winter of 1872-73, still quoting from Mr. Harrington, "The Haycock Iron Mine was opened and about 5,000 tons of ore raised." The mines are situated about eight miles northeast of the City of Ottawa, in the Province of Quebec, and the works consisted of a "steam saw-mill, Bloomary forge, engines, pumps, steam hammer, workmen's cottages, stables, &c. Some blooms were made and exported to England; the iron was of very fine quality, but the enterprise was not commercially successful and the place was closed, and has not for some years been used. The Ottawa Iron and Steel Manufacturing Company recently acquired the property.

EXPERIMENTAL WORKS IN MONTREAL.

The Canadian Iron and Steel Company, of Montreal, were incorporated in 1881 to test an invention of Dr. George Duryee's, of New York, for making wrought iron direct from the ore. The process was patented, and was called the "blow pipe process." Crude petroleum was the fuel used, it being dripped into a strong blast and vapourised. An experimental furnace had been built in Toledo, O., and some iron is claimed to have been made there with however very doubtful result, but the inventor, sanguine, after his kind, urged that by certain improvements in the furnace, eventual success could not be a matter of doubt.

A site was chosen in Hochelaga, a suburb of Montreal, and about a twelve-month was occupied in perfecting the machinery and getting everything ready. The furnace consisted of an iron cylinder lined with firebrick; the cylinder was inclined and made to revolve, it was 120 feet long and five feet in diameter for 100 feet, the remaining twenty feet, being ten feet in diameter. The iron ore was ground fine and mixed with flux, and introduced into the elevated end of the cylinder, and gradually worked down as the cylinder revolved. The heat from the combustion of the vapourised oil was intense, and when, under its influence, the particles of ore began to melt, they stuck together, and by the time they reached the "puddling chamber" at the enlarged end, should have gathered into balls, which, when ready, were to be taken out and hammered into blooms.

The experiments were continued about twelve months, and iron ore from Hull, Baie St. Paul, Moisie sand and Bog ores, were tried, with limestone, clay, and quartz as flux, but although a small quantity of iron was produced, the experiments could not be called successful, and so after spending some \$70,000 or \$80,000, they were stopped.

MONTREAL IRON WORKS.

In Montreal there are, at present, four rolling mills, which manufacture iron for their own use, from wrought iron scrap and imported puddled bars. For tack making the best quality of English sheet iron is imported and Swedes charcoal tack-strips, the product being spikes, nails, horse shoes, tack brads, springs, bolts and nuts in the one case, and butt welded iron pipe in the other. They may be enumerated as follows :—

Montreal Rolling Mills Company: Manufacture cut nails, pressed

nails, horse nails, tacks, brads, &c., and iron pipe butt welded. Both mills are worked by steam power.

The Pillow, Hersey & Co.'s Works : Produce cut nails, railway and pressed spikes, horse shoes, cut tacks, brad and shoe nails, also carriage, tire and other bolts, coach screws, hot pressed and forged nuts, &c. The rolling mill is run by steam, and the bolt factory, &c., by water power.

The Works of Peck, Benny & Co. : Produce nail plate, cut nails, clinch and pressed nails, horse shoes and horse shoe nails, ship and railway spikes, and tacks of all sorts. These works are operated by water power.¹

The Metropolitan Rolling Mills, Abbott & Hodgson, Proprietors : Manufacture railway and ship spikes, horse shoes, clinch, pressed, cut, barrel, box and other nails. This mill is run by steam power.

¹ Taken from: Mr. W. J. Patterson's Board of Trade Report, 27th August, 1883.

CHAPTER III.

EARLY ENTERPRISES IN ONTARIO.

The first attempt to manufacture iron in Ontario was made at Lyndhurst, then called Furnace Falls, on the Gananoque River, in the County of Leeds. This county was first settled in 1785 and its boundaries established by proclamation on the 16th July, 1792.

About the year 1800, a company composed of Ephraim Jones, Daniel Sherwood, Samuel Barlow and Wallace Sutherland erected a blast furnace at the Falls, the water power being no doubt utilized to drive the machinery and work the blast.

"The ore was of inferior quality and had to be drawn a considerable distance, consequently the enterprise was not a financial success, being abandoned after two years trial. At one time an attempt was made to cast hollowware for the use of settlers, including pots and kettles, but proved a complete failure." Such is the account given by Thad. W. H. Leavitt in his history of the united counties of Leeds and Grenville.¹

A forge for the manufacture of bar iron was built about the same time for the same company, and was in operation until 1812, when, from want of capital, and on account of the derangement of business, consequent upon the war of that year, the place was shut up and never opened again. The ruins are still visible.²

NORMANDALE FURNACE.

The next attempt made was in Western Ontario, at Normandale, then known as Potter's Creek, in the Township of Charlotteville, in the County of Norfolk, in the then London district. The boundaries of the county were established by proclamation the 16th July, 1792, and the township contained 900 people and 132 inhabited houses in 1817.

¹ Brockville, 1879, p. 62.

² I am indebted to Mr. S. McCameron, of Gananoque, and Mr. E. C. Slater, of Sweets Corners, Ont., for these particulars.

In the year 1815 Mr. John Mason, an Englishman, undertook to manufacture iron and in two years time he had a blast furnace in operation, which was "of a rude and primitive description, entirely "the labour of his own hands, with the exception of the machinery for "the blast. The bellows were formed out of two hollow whitewood "trees. It is thus that the spirit of enterprise and necessity, which "has so truly been called the mother of invention, enables an individual in this young country to overcome difficulties which in other "situations would be considered insurmountable."¹

Mr. J. Harris, R.N., who furnishes the information, goes on to say in regard to the situation chosen for the furnace: "With respect to "water they have a great advantage, Potter's Creek, though not large, "is a never failing stream. The works are situated at its entrance, "immediately on the shores of Lake Erie, hence the great convenience "of sending off their weighty manufactured articles, or of receiving "any supplies which they may require, without the expense of land "carriage. Moulding sand is abundant on the site of the furnace, and "timber for charcoal is easily obtained and in great variety: the hard "maple is preferred."

In Robert Gourlay's Statistical Account of Upper Canada,² the following letter from Mr. Mason is to be found:—

"POTTERS CREEK, Dec. 4th, 1817.

"SIR,

"You desired me to give you every information in my power of the probability or certainty of making iron in this part of the Province, so as to be beneficial to the manufacturer and the public. I will state to you what is for, and what against. In favor of iron works is the high price of iron and plenty of timber for coal; everything but these is against the first beginner. The bog ore is scattered over the whole country, but I do not know of any one bed of ore that will exceed 120 tons. I spent three months in examining the country for ore, and I calculate that it will take all the ore I found within twenty miles of this place to supply a small furnace for seven years, but I believe considerable quantities within that space are not yet found. No rock ore has as yet been found in this part of the Province, and if there is any, it must be at considerable depth from the surface of the ground and will be difficult to find, as the strata lie horizontal. An-

¹ Lieut. Baddely's paper in Lit. and His. Soc., Quebec, 1830. Vol. ii, p. 420.

² London, 1822.

other thing against iron works is, that it will require many experiments before we can know the best method of working the ore, and there is not any stone in this part of the Province that will stand the fire, and I believe it will be best if it comes from three different places in the United States. I want five or six pieces of iron, each 30 cwt., these will come to an enormous expense. I intended to ask the Government to give or lend me five or six disabled cannon for this. I asked the Government to pay the passage of five or six families from England to work in the furnace. This could not be granted, and therefore I would not ask for the cannon. Another thing against me is that there is not a man in the country that I know capable of working in the furnace. But the greatest difficulty I have to overcome is iron men, as we call them, who are the very worst sort of men to manage, colliers not excepted. Not one of a hundred of them but will take every advantage of his master in his power. If I have just the number of hands for the work, every one of them will know that I cannot do without every one of them, therefore every one of them will be my master, anxiety and trouble will be the consequence; and if I keep more hands than are necessary, so as to have it in my power to turn those away who will not do right, this will be expensive. But, after all, if the ore is as good as I expect, I hope to reduce the price of iron very considerably. The place where I am is a reserve lot. Governor Gore has promised encouragement to the works, when the Government is satisfied they will answer a good purpose. If Governor Gore does not return to this country, and what he promised should be refused me, iron works will be at an end with me and at this place; but I shall not ask for the promise until the inhabitants of the country will be my bondsmen for the benefits arising from the iron works. When I saw you I offered a considerable sum of money to take them off my hands; this I repeat, not but what I believe they will answer, but the trouble will be more than equal to any profit from them. Those who begin iron works in this country after me, will start many thousand dollars ahead of me, everything they want, except stone, will be had here, the best method of working the ore will be known, and men will be learned to work it.

"I am, sir,

"Your obedient servant,

"JOHN MASON."

In spite of his enterprise and perseverance, poor John Mason never reaped any benefit from it, he had only made a few tons of iron when

the inner wall of his furnace gave way and became "bunged up," so that it was of no use. This discouraging event seemed to prey on his mind, and he sickened and died, leaving the property to his widow and son.

In 1820 the property was purchased by Mr. Joseph Van Norman, who is now in the 89th year of his age, and is living at Tilsonburg. The following particulars were obtained from him and kindly furnished by his son, Mr. G. R. Van Norman, Q.C., of Brantford.

In 1821 Mr. Van Norman formed a partnership with Mr. Hiram Capron, late of Paris, and Mr. George Tilson, late of Tilsonburg, and commenced building a blast furnace, which was completed and put in blast in 1822, after an expenditure of \$8,000. The iron turned out was of excellent quality, and the ore fairly rich. It was bog ore and was found in the swamps and marshes in the vicinity, being hauled in by wagon teams, a distance varying from six to twelve miles. The average consumption per day was nine tons, producing about three tons of pig iron. The furnace would be in blast about eight or nine months out of the year, running night and day, and producing 700 to 800 tons of iron, with an annual consumption of fuel equal to 4,900 cords of hard wood, made into charcoal in the usual way.

In 1830 the works were burnt down, but were immediately rebuilt on an extended scale.

In the early stage of the enterprise, all the iron made was converted into various kinds of castings, there being no market for pig iron, and as a consequence the wants of the country at that time becoming overstocked, some was exported to Buffalo, and a vessel load of stoves and castings sent to Chicago. The wares produced were disposed of, along the shores of Lake Erie, from Fort Erie to Amherst Bay, and taken into the interior of the country by teams. Before the opening of the Welland Canal, stoves, kettles, and other iron ware were sent very long distances by teams, particularly in winter, going as far as Chatham, Waterloo and beyond St. Catharines. After the opening of the Welland Canal (the first vessels passed through in the year 1829,) places on the Canal and Lake Ontario were accessible by water, and accordingly two vessels were employed by Mr. Van Norman, and kept busy during the summer. Hamilton, Toronto, Port Hope, Kingston, etc., were thus supplied, and from these centres the wares were distributed into the back country. Some of the goods were sent as far as Montreal. The business seemed to be the right thing for the country, and started at the right time to be of use to the

new settler, to furnish him his sugar kettles, his kettles for boiling the ashes gathered from the burning of his log heaps, as at that time the pot-ash, made from these ashes, was the only exportable article which could be shipped to foreign countries and for which money could be obtained.

There was in these days no money in the country, and business was carried on by barter or exchange of commodities. Anything the people had to sell was brought to the furnace and exchanged for the wares in payment, or due bills were taken payable in iron ware. Due bills were in this way used as a kind of circulating medium over a large section of what is now the Province of Ontario. At one time the books of the establishment showed outstanding over \$30,000 of these demand due bills for iron, and then for a time the practice was discontinued.

At the expiration of five or six years, Mr. Joseph Van Norman, who was the managing partner, and gave the name of Normandale to the locality, bought out his partners, and took his brother Benjamin into the business, but he retired after a few years and the concern was carried on in the name of J. Van Norman & Son till 1847. By this time both fuel and ore were well nigh used up in the neighborhood of the furnace, and it was abandoned. The firm had also a forge in the vicinity of Port Dover, where for some years they carried on the manufacture of bar iron for horse and sleigh shoes.

After the closing of the Normandale furnace, its owner paid a visit to the Marmora Iron Works, which will now be described.

MARMORA IRON WORKS.

The Township of Marmora, in the County of Hastings, has long been noted for its iron ores. "In 1821 the township was first advertised for sale, but from the rocky and swampy character of a large portion of the land, it did not make much progress towards settlement, and, in 1850, only contained 593 inhabitants."¹

The village of Marmora is situated on the Crow river, 41 miles from Peterboro, 32 miles N. N. W. of Belleville.

Iron works were first commenced at Marmora about the year 1830 by a Mr Hayes, who, after spending a large fortune and the fortune of his wife, had to give up the property to his creditors; the late Hon.

¹ Smith's Canada, 1851, p. 246.

Peter McGill, of Montreal, to whom over £40,000 was owing, in this way came into possession of the place, and the works were for a time carried on in his interest, under the management of a Mr. Manchan, who represented Kingston in the Upper Canada Parliament, but they resulted in a heavy financial loss.

In 1847, Mr. Van Norman visited the works and was tempted by the appearance of the great ore beds in the immediate vicinity (the Blairton Big Bed) and the general appearance of the place, to continue to Montreal and see Mr. McGill; he did so, and bought the property for \$21,000.

In the fall of the same year, he moved to Marmora, and after expending a large sum in fitting up the furnace, putting in machinery, ovens, blowing apparatus, erecting and repairing buildings, cutting cord wood and making it into charcoal for fuel, everything was finally ready and the furnace was started the following summer. The result was a bitter disappointment, for after being used to an easily reducible bog ore, Mr. Van Norman now had to treat a rock ore, very rich in metallic iron. The amount of charcoal used per ton of iron was consequently very large, and nothing but loss attended every effort he made. After the iron was made, it had to be carted thirty-two miles to Belleville, over rocks, and "corderoy" roads so rugged that the wagons were constantly breaking down, and even the shoes of the horses were pulled off, roads existing merely in name. It was found absolutely necessary to get some new route, so a road was opened from the works to Healey's Falls, on the river Trent, a distance of nine miles, and the iron taken from there by steamboat to Rice Lake, and carted thence twelve miles to the dock at Cobourg.

Up to this time the price of iron ranged from \$30.00 to \$35.00 per ton, and found a ready sale at these prices. In 1848, however, the St. Lawrence canals were completed, and England had adopted the principles of Free Trade, the consequence being that pig iron was brought up and sold in Belleville and Cobourg at \$16.00 per ton. This settled the question of making charcoal pig iron for Mr. Van Norman, who quotes these prices. He had to stop the works and lose everything, not having even money enough left to get away from the place. Relief came, however, unexpectedly in the shape of a letter from Mr. McGill, expressing regret at his failure and enclosing a cheque for £100.

We shall again hear of Mr. Van Norman in iron manufacturing enterprise, but must first complete the story of Marmora.

The next proprietor was a local concern from Belleville, called the Marmora Foundry Company. A gentleman connected with the company furnished the following :—¹

"A company was formed in Belleville for the purpose of purchasing the property and making another attempt to work the mines. The Marmora Iron Works, the property of the Marmora Foundry Company, are situated on lots Nos. 9 and 10, in the fourth concession of that township. The works, which are erected on the bank of the Crow River, a short distance from the foot of Crow Lake, are very extensive, and consist of two blasting furnaces of good size, one of which has been within a few months almost newly built, and lined with Stourbridge brick, and is ready for use at any time, when the operations of the company may be resumed. The blast (which is called the "hot blast") is furnished by a new and improved cylinder apparatus with air heating ovens on the most approved principle, and is driven by a powerful and never failing stream of water. This furnace has been in blast but for a short period, and that only for the purpose of testing the practicability of working the ore, so as to produce such a quantity of iron per diem, as would leave reasonable expectations of the manufacture proving profitable. The Company therefore spared no expense in fitting up the furnace, which was done under the superintendence of an eminent iron founder and practical assistants. The quantity of iron (pig) produced from this furnace was five tons per day of very superior quality, and it was found that the probable cost of manufacture, in a blast of longer duration, would not exceed three pounds, or three pounds five shillings per ton.

"Owing to some difficulty between the directors and a portion of the stockholders, who had refused payment of their stock, the works were stopped after this experiment, and will not probably be resumed for a year or two, unless the Company succeed in leasing the premises to some practical person, a course which they would prefer, rather than carry them on in future on their own account.

"The premises of the Company are very extensive, and comprise (in addition to the blast furnaces and several large houses for storing charcoal) a large stone building with trip-hammer, for the manufacture of bar iron, several stone buildings and houses, used for shops, boarding houses, &c., and about twelve frame dwelling houses occupied formerly by the work people of the establishment, which are

¹ Smith, Canada, 1851, p. 247.

now rented out to various parties. There are also a flouring mill, a saw mill, and a building formerly a tannery, but now about to be converted into a clothing and fulling factory, all driven by the same stream (which is capable of propelling three or four times as much machinery from the same head) over which a very handsome and suitable bridge was built last year. A church (Roman Catholic) built of stone and of very neat construction, is situated nearly opposite the bridge, on the western bank of the stream. All of these buildings are on the property of the Company and form together a compact and flourishing village, in which is a post-office. On the north side of the village, and also on the property of the Company, a town plot has been laid out, and a few lots sold, on which buildings are now being erected by the purchasers, but the whole of the grounds on which the buildings above described stand, is intended by the Company to be reserved for the purpose of leasing to tenants. On the south side of the village is a well cultivated farm, with handsome dwelling houses and suitable out-houses, gardens, &c., also the property of the Company.

"The ore bed (or rather the main ore bed from which the furnace was supplied, for there are many valuable beds of magnetic iron ore in the neighborhood and some of bog ore) is situated on a high bank on the shore of Crow Lake; it is mined easily and loaded on board scows for transport to the works, from which the ore bed is distant about three miles and a half. The ore is a magnetic oxyde, very rich, three tons yielding two ton of iron. Excellent as is the cast iron made from this ore, it is still more suitable for bar iron, the toughness and ductility of that which has been made there giving it a preference to the best Swedish iron. Marble and lithographic stone was also on the property of the Company, samples of the latter were sent to the great exhibition at London and received (as did also the iron and specimens of ore sent) favourable notices from the English press." From authentic accounts this Company sunk about £20,000 in their venture.

In 1856 an English Company came to the fore. Mr. Wm. Hainsworth, now Superintendent of the Pittsburgh Steel Casting Company of Pittsburgh, Pa., one of the largest and most successful works of this sort in the United States, was sent out from England to Marmora, and Mr. Vernon Smith, who had just left the Woodstock Iron Works of New Brunswick, took charge. He rebuilt the old furnace and afterwards built a new one cased with iron. The place seems to have been dismantled before he took charge; it was however again put into working order, but did not run long. Mr. Smith says, "the iron was too rich

for economical working in a blast furnace; if flux was not very largely used, the iron being converted into wrought iron and *burning*, not melting." By the time they stopped, Mr. Van Norman estimates they had lost not less than £70,000.

In 1866, one of the furnaces was put in blast by a Mr. Bentley, of Marmora, and remained working for forty days,¹ and in 1867 the property passed into the hands of an American Company, who mined the ore and shipped it to Pittsburg. In 1869, they amalgamated with the Cobourg and Peterboro' Railway Company, and have since been known as the Cobourg, Peterborough and Marmora Railway and Mining Company. They for some years shipped annually a large quantity of ore, a railway having been built on the same route Mr. Van Norman had opened to Cobourg.

In 1875 an attempt was made by Mr. W. H. Fraser, now of Ottawa, to smelt iron ore with crude petroleum in one of the Marmora furnaces. In the proceedings of the Iron and Steel Institute of England, for that year, a short notice is given of it, but they "fear not much good will result." The experiments were not commercially successful.

MADOC BLAST FURNACE.

In the year 1835, Mr. Uriah Seymour, of Wolcott, Wayne County, New York, took some iron ore from Madoc, in the Township of Madoc, County of Hastings (not very far from Marmora), and tried it in his furnace at Wolcott, and two years afterwards built a blast furnace at Madoc. He was never able to produce much iron, but succeeded in losing all his means, and his partner having been killed in the mine, Mr. Seymour closed up, and the place has never since revived.²

HOUGHTON IRON WORKS.

We now hear again of Mr. Van Norman, and with him of the last smelting enterprise in the Province. After his failure at Marmora, he returned to his old home at Normandale. About this time the Great Western Railway (now G. W. Div. G. T. R'y.) was under construction. Messrs. Fisher & McQueston, of Hamilton, Ont., were furnishing car wheels to the Company and had a great deal of trouble to get charcoal iron suitable for making car wheels. The iron formerly made at Normandale was just the kind which was wanted, and an offer was made

¹ Geological Survey, 1863, p. 676, and 1866, p. 108.

² Geological Survey, 1863, p. 675, and 1866, p. 109.

by them to Mr. Van Norman, to take all the iron he could make, at a price which promised to pay well, viz., \$45.00 per ton. A contract was entered into, a clause being therein inserted, providing that the iron should be suitable for the manufacture of car wheels. (These wheels are cast in a sand mould, having a heavy piece of cast iron, called a chill, all round the edge. When the molten iron is poured into the mould, and just where it comes in contact with the cold cast iron, it chills and hardens the metal; this forms the "tread" or wearing surface of the wheel; when broken, the fracture shows a white chill, varying from one half to three quarters of an inch in depth.) A person was at once sent into the Township of Houghton, in the County of Norfolk, to prospect for bog iron ore, and on his having reported that it could be found in sufficient quantities, a blast furnace was at once built and placed in operation in the fall of 1854. In the following spring, 400 tons of iron were shipped, but upon being tested this iron was rejected, as it would not chill. It had to be sold and only brought \$22.00, which was below the cost of production, so the works, which had cost about \$30,000, were abandoned, and Mr. Van Norman's career of over thirty-four years in the blast furnace business ended, he having unfortunately lost at Marmora and Houghton all that had been made at Normandale.

FURNACE FALLS IRON COMPANY.

After an interval of eighteen years, during which time a number of projects had been talked of, a blast furnace was commenced in 1882 by Messrs. Parry & Mills, of Chicago, at a place they named Furnace Falls, on the Burnt River, in the County of Haliburton; but, after an expenditure of about \$35,000, the works were stopped for want of capital to complete them, and they still remain in this unfinished condition.

Apart from blast furnaces, a number of other iron industries have, at various times been, and some are still, in operation. They may be enumerated as follows:—

TORONTO ROLLING MILLS AND IRON WORKS.

About 1860 Messrs. Gzowski & Macpherson, of Toronto, started a large rolling mill in that city for the special purpose of re-rolling iron rails; some bar iron was also made out of scrap. The works were situated in the east end of the city, on the south side of South

Front street. About 1873 the place was closed and dismantled, and the land is now owned by the Grand Trunk Railway Company, it being at present the site of their car repair shops. The cause of the mill being closed was the substitution of steel for iron rails.

In 1866 "The Steel, Iron & Railway Works Company" was organized in Toronto and a charter granted by the Ontario Legislature.¹ The authorised capital stock was \$115,000 and the special object of the company was to operate a patent granted to a Mr. Hugh Baines, and dated 27th July, 1865, "for making railroad crossing points, and for putting steel ends or sections on railroad rails." The works were situated in the west end of Toronto, on the west side of Strachan Avenue, alongside the Great Western (now G. W. Div. G. T.) Railway, and their operations were confined to patching iron rails and making some forgings. The adoption of steel rails closed the works, but they were resuscitated in 1872 by being merged into the "Canada Car and Manufacturing Company," a concern chartered by the Provincial Legislature,² with an authorised capital of two million dollars, for the manufacture and leasing of railway cars.

"On the 9th of August, 1872, a contract was entered into by the Government of Ontario and the Canada Car Company of Toronto, under which the Government leased to the said company for a term of seven years and a half from 1st January, 1874, the labour of all the prisoners sentenced to the Central Prison, except such as was required to carry on the domestic work of the prison.

"This contract provides that prisoners shall not be sentenced to the prison for a shorter period than three months, and that they shall not, through physical or mental defects, be unfit to perform an ordinary day's labour, consisting of ten hours per day, less two hours every week. The Government is to furnish sufficient workshop space (with foundations for machinery and other permanent fixtures) properly heated and lighted, to enable the industry to be carried on, and the boilers, engines and shafting required for motive purposes, not exceeding one hundred horse power,—the engineers and firemen to be provided by the Company as well as the fuel for the furnaces.

"The Company is to employ the prison labour thus leased, in the manufacture of railway cars, in all its various branches and requirements, as well as in the manufacture of nails, bolts and spikes of every description, &c.

"For the prison labour thus leased the Government is to receive

¹ Cap. 110, 26-30 Vic.

² Cap. 114, 36 Vic.

from the Company the sum of fifty cents per day for each and every prisoner during the first two and a half years' existence of the contract, for the second two and a half years fifty-five cents, and for the third and last two and half years the sum of sixty cents per day."¹

The Company's premises adjoined those of the Central Prison, which was in course of construction. The prison buildings were not designed for this class of manufacture, but were altered and made to answer, several railway sidings were laid and the appliances put in were of the latest description. There were also introduced a forge with four large beam-hammers, and the necessary furnaces and plant, for the manufacture of locomotive and car axles, and large forgings out of scrap iron, several small hammers, a wheel foundry equipped to turn out 120 car wheels per day, a large foundry for soft castings, and shops and machinery for making bolts, nuts, washers, together with a variety of iron and wood working tools. Large stocks of wood, iron, coal, &c., were laid in for an extensive business.

From 200 to 350 prisoners were now ready and their wages of fifty cents per day had to be paid. About this time a period of very severe depression set in, and orders for cars were not to be had at any price, and after building about 100 or 200 cars, and altering some trucks for the Intercolonial Railway, the company collapsed, and the place was subsequently dismantled and sold.

HAMILTON ROLLING MILL.

About 1864, the Great Western Railway Company erected a rolling mill at Hamilton, (which cost about \$107,000, and had a capacity of about 7000 tons per annum²) to patch and re-roll iron rails: it continued in operation till the 8th March, 1872,³ when it was closed. In 1879 it was leased to the Ontario Rolling Mill Company, which is still in operation, and is manufacturing bar iron, nail plate, and fish plates, out of wrought scrap. The mill has now a capacity of about 12,000 tons per annum. A nail factory is run in connection with it.

STEEL WORKS AT NIAGARA.

A venture in the way of steel making was tried in 1873, when

¹ Extracts from Report of Inspector of Prisons, &c., for 1871-2-3. Sess. Papers, Ont., No. 27, 1874.

² The Railways of Canada. Trout 1870-71, p. 93.

³ G. W. R. Report.

"Date's Patent Steel Company" was formed in Toronto, with a capital of \$50,000, to manufacture steel under a patent granted the 23rd December, 1872, to H. H. Date and F. H. Date, for a new process of converting iron into steel, and known as "Dates' Steel converting process:" a charter¹ was obtained, and complete works for the manufacture of edge tools, &c., were erected at Niagara. The product of the factory proved uncertain. Some of the tools, such as axes and hammers, would stand the most severe treatment, whilst others would not, and thus the goods were so unreliable as to be unsaleable and the place had to be closed. Last year some experiments were made there by Mr. A. G. Wright, of Toronto, in the same direction, but with similar result.

LONDON STEEL WORKS.

The London Steel Works Company, of London, Ont., started in 1883, and built works containing one 30 Pot, Siemens melting furnace, and a rolling mill, driven by steam, with a ten inch train of rolls, the annual capacity being 3,000 tons of cast steel. The works were put up specially to make steel castings and the Washburn Patent car wheel, which has a cast iron centre, and homogeneous cast steel tyre. The Company proposed also to make bar steel, flats and rounds, coil springs and the best qualities of bar iron. In 1884 a new puddling furnace was built and steam hammers put in, to make steel and semi-steel by a new process, but, following in the wake of their predecessors, the concern failed and the place was closed.

FORGE AT HAMILTON.

The Hamilton Iron Forging Company, of Hamilton, Ont., make car axles and forgings out of wrought scrap, and have a complete forge. They commenced about 1878 and are still running.

¹ Chap. 123, 36 Vic.

CHAPTER IV.

SMELTING IN NEW BRUNSWICK.

This Province has not witnessed many attempts to manufacture iron, only one smelting works having been built. In 1836 iron ore beds were discovered at Woodstock, in the County of Carleton, by Dr. T. C. Jackson, of Boston, Mass., during a geological survey conducted under his guidance, by the authority of the State of Maine.¹

About 1848 "The York and Carleton Mining Company" obtained a subsidy from the Provincial Government of 10,000 acres of picked land, and expended altogether about \$30,000 in erecting a blast furnace, two blowing engines, a helve hammer, operated by a separate small engine, boilers, buildings, &c. Within a year or two, the works and the furnace were injured by a fire. Repairs were made, and the works again put in operation. Another misfortune overtook them. Charcoal was used as fuel, and it one day happened that some small repair necessitated the stoppage of the blowing engines for a few hours. With the object of saving the charcoal, the furnace was "banked" by piling sods on the top of it; there was a large "receiver" between the two blowing engines, and by some mistake, the air valves were left open, gas generated in the furnace, which being "banked" prevented its egress to the outside, and caused it to "back up" through the open valves into the air pipes and receiver. After a stoppage of about four hours the engines were started again, and on the second revolution an explosion took place, which wrecked the furnace and buildings, and ruined the Company. Mr. Vernon Smith, C. E., who kindly furnished most of the foregoing particulars, came out from England about 1854, as the agent of Mr. Charles Sanderson, of Messrs. Sanderson Bros., of Sheffield, for the purpose of making iron to be used in the manufacture of steel, as, owing to the war with Russia, the supply of iron from that country was stopped.

The works were now rebuilt, and remained in operation for about

¹ Mines and Minerals of New Brunswick, by Professor L. W. Bailey, 1864, p. 55.

eighteen months, during which time about 1,000 tons of iron were made. They were then closed and remained idle for some years.

In 1862 the property passed into the hands of Messrs. Morris Best and Ellis Smith, who worked it as "The Woodstock Charcoal Iron Company." White pig iron was made and exported to England, and was used by Messrs. John Brown & Co., of Sheffield, in the manufacture of armour plates. Although the iron made is stated to have been of superior quality, the cost of the production was too great, and as a consequence the place was closed and has not been operated since. The Woodstock ores are very "lean" and contain a large proportion of phosphoric acid, besides being very difficult to "dress." The furnace was situated in the village, about three miles from the ore deposits.

WORKS FOR THE MANUFACTURE OF WROUGHT IRON, &C.

The most important of these was incorporated in 1873, as the "Coldbrook Rolling Mill Company,"¹ with a capital stock of \$1,000,000, for the manufacture of "bolts, screws, nails, axes, rails and railway iron, boiler plate, rivets, tools, implements, machinery, &c." A rolling mill was built at Coldbrook, three miles from St. Johns, N.B., on the Intercolonial Railway, and a nail factory in connection with the mill was situated a mile or two away, on the hill side and driven by water power. Old iron rails and scrap iron were the raw material used, and were converted into nails, spikes, bar iron and ship knees.

The works were in full blast for some years, when the Company failed, and the place lay unused and idle till last year, when the property was purchased by Messrs. I. & E. R. Burpee, of St. John, who are now working it. They advertise they are now prepared to supply common, refined and horse shoe bar iron, nail plates, mine rails eighteen pounds per yard, angle iron, fish plates, and ships knees and straps.

IRON WORKS IN ST. JOHN.

The Portland Rolling Mill are makers of nail plate, forgings, car axles and ships knees, &c., out of wrought scrap. The mill is in Portland, a suburb of St. John, and is owned by Messrs. James Harris & Co., the car builders who manufacture, amongst a variety of other things, the Washburn patent car wheel, which has a steel tyre, cast homogeneously on a cast iron centre.

Messrs. J. A. & W. A. Chesley make forgings, ships knees, &c., at their rolling mill in Portland, St. John.

¹ Cap. 121, 36 Vic.

CHAPTER V.

THE MANUFACTURE OF IRON IN NOVA SCOTIA.

A discovery of iron ore was made in the year 1604, by the *Sieur de Monts*, who had been appointed the previous year Lieutenant-General of Acadia, by Henry IV of France. He sailed from Havre de Grace the 7th April, and arrived at a harbour on the South Eastern side of Acadia. After some explorations around the coast, he doubled Cape Sable, and anchored in St. Mary's Bay. Here they remained several days, and, while surveying the coast, discovered a vein of iron ore.¹ At St. Mary's Bay, west of Digby, titaniferous iron ore is found as sand, forming bands of irregular extent in the beach, the indications being extensive.²

"The first attempt to manufacture iron was made in the first decade of the present century, when a small quantity of bar iron was made in a Catalan forge from the ores at Nictaux."³

MOOSE RIVER IRON WORKS.

The next enterprise is thus described, by Haliburton in his History of Nova Scotia:⁴ "In the year 1825 an association was formed for the manufacture of iron, called the "Annapolis Mining Company," with a capital of £10,000, divided into one hundred shares of £100 each. An Act of Incorporation was passed by the Legislature, and the Governor was authorised to grant to the Company, a charter under the Great Seal of the Province. It was also protected by a clause of the Act, which provided that no stockholder should be liable for any debts contracted by the Company, beyond the amount of his shares. As a further encouragement, two bounties of £600 each were offered for the manufacture of a certain quantity of hollow ware

¹ The Pioneers of France in the New World. Parkman, p. 220. Also compare History of Nova Scotia. Haliburton, 1829, p. 12.

² Mines of Nova Scotia. Gilpin, 1880.

³ Nova Scotia Mines Report 1877, p. 43.

⁴ 1829, p. 162.

“and bar iron. The associates immediately purchased an extensive
“and valuable vein of ore, situated about three and a half miles from
“the mouth of the Moose River, and another of equal importance at
“Nietaux, in the upper part of Annapolis Township, with one or two
“of smaller extent in other places. The local superiority of the former
“place gave it a decided superiority over any other part of the coun-
“try, being distant only eight miles from Annapolis, twelve from
“Digby, and fifty from St. John, N.B., accessible by water, and afford-
“ing a good anchorage. They therefore selected the eastern bank of
“the Moose river as the site of their buildings, and erected a large
“smelting furnace, coal houses, stores, &c. (Mr. Cyrus Alger was the
“superintendent.¹) The extensive forest at the head of the river, sup-
“plied them with an abundance of charcoal.

“They have already (1828) manufactured a quantity of hollow-
“ware, and are now engaged in laying the foundations of forges, for
“making bar iron. To carry these objects into effect, they have
“increased their capital to more than twice its original amount. The
“quality of the ore has now been ascertained, and the only part of the
“experiment yet to be decided is, whether they can compete with the
“English ware, or whether the cost of production will not exceed the
“value of the article when manufactured, a result which must depend
“very much upon the economy and skill with which the establish-
“ment is managed.

The works were only in operation a short time when “they were
“suddenly suspended, owing to political causes, but not before excel-
“lent iron had been produced, both pig iron for foundry purposes and
“refined bar iron.”² For thirty-three years the works were closed, and
when operations were resumed, it was for a short time only, to be again
neglected for ten years more. In 1872 one hundred and sixty tons of
pig iron were made and shipped to Boston, but since that time nothing
has been done.

EXPERIMENTS IN PICTOU COUNTY.

In 1828 an attempt was made by the General Mining Association
to smelt some clay iron stone and East river ore, in a foundry cupola,
at the Albion Mines, Stellarton, and, as might have been expected,
the experiments were not a success.

¹ Mines Report, 1877, p. 43.

² Mines Report, 1877, p. 43.

NICTAUX FURNACES.

Two blast furnaces were built at Nictaux (one in 1856), but they did not remain long in blast, and the iron produced is said to have been of poor quality, on account of "the phosphorus in the ores." In 1874 the furnaces were "in ruins, having been partly torn down by the people in the neighbourhood to obtain the bricks."¹

BLOOMFIELD FURNACE.

About 1860 a blast furnace was put in operation at Bloomfield, to smelt the bog ores of that district, and it has been in blast several times since then.²

ACADIA IRON WORKS.

We now come to the most important iron works of the Dominion, viz., those at Londonderry:—

The great vein of the Acadia mines was discovered by the late Mr. G. Duncan,³ of Truro. In 1845, Dr. Gesner, and in 1846, Mr., now Sir William Dawson, visited and reported on the iron deposits in the Cobequid Hills: and again, in 1849, Sir William Dawson, this time in conjunction with Mr. J. L. Hayes, of Portsmouth, N.H., went over the ground; and their report, made to Mr. Charles D. Archibald, of London, resulted in the property being developed,⁴ and a charcoal blast furnace, with the necessary buildings, being built in 1853, by the "Acadia Mining Company." In 1850 a Catalan forge was put up, and a small quantity of bar iron made, but this was discontinued, when the furnace was put in bl

The charcoal blast furnace, which was built in 1853, continued in blast till 1874, and is estimated produced about forty-five thousand tons of pig iron.

Sir William Fairbairn speaks of the Londonderry iron as follows:—⁵

"The Specular Ore of the Acadian Mines, Nova Scotia, is said by Dr. Ure, to be a nearly pure peroxide of iron. . . . The

¹ Geological Survey Report, 1874. Harrington "Iron Ores."

² Mines of Nova Scotia. Gilpin, 1880, p.

³ Natural History Society, Montreal, Vol. VII, p. 134.

⁴ Acadian Geology, Dawson, p. 582.

⁵ Iron, its History, Properties and Processes, of Manufacture, by Wm. Fairbairn, C.E., L.L.D., F.R.S., F.G.S., page 34.

Acadian Ores are situated in the neighbourhood of large tracks of forests capable of supplying almost any quantity of charcoal for the manufacture of the superior qualities of iron and steel. Several specimens of iron from these mines have been submitted to direct experiment, and the results prove its high powers of resistance to strain, its ductility, and adaptation to all those processes by which the finest descriptions of iron and steel are manufactured.

"The difficulties which the Government have had to encounter, during the last two years in obtaining a sufficiently strong metal for artillery are likely to be removed by the use of Acadian pig iron. Large quantities have been purchased by the War Office, and experiments are now in progress under the direction of Lieutenant-Colonel Wilmot, Inspector of Artillery, and the writer, which seem calculated to establish the superiority of this metal for casting every description of heavy ordnance."

The site chosen by Mr. Archibald for the furnace and buildings was on the west branch of the Great Village River, immediately on the ore deposits of that place. The nearest shipping point by water was at Great Village, some six miles away, and there were no means of communication except by teams. The importance of obtaining railway communication was very great, so, when the Intercolonial Railway surveys were being made in 1864, Mr. John Livesey, who at that time represented the iron works, exerted himself to get the railway as close as possible to the works.

Mr. Sandford Fleming, in his History of the Intercolonial Railway, says: "Mr. Livesey continually urged, both privately and officially, the importance of locating the railway on a route passing close to the iron mines in which he was interested." "The working season of 1865 was occupied in surveys. Every pass across the Cobequid Mountains, within the limit of the iron district, was examined, and every effort made to secure a practical line near the iron works."

The Chief Engineer, Mr. Fleming, favoured a line which did not run close to the works, and a discussion was carried on very warmly in Nova Scotia. The matter had finally to be referred to Ottawa, as in 1867 the provinces were confederated, and the Dominion came into existence.

Six different routes had been surveyed, and one of them, a sort of compromise, was finally adopted by the Dominion Government, and by a letter of the 6th November, 1868, the Chief Engineer was instructed

to carry it out. Mr. Fleming goes on to say: "Thus the controversy " was ended; and hence arose that gigantic and conspicuous sweep, " which the railway traveller will observe on the southern flank of " the Cobequid Mountains, where the line describes nearly half a complete circle. So marked is this feature in the location, that the " popular voice has applied to it the term, 'The Grecian Bend,' which " possibly may be retained so long as the railway endures,"

In October, 1873, the Acadia Iron Mines were purchased by the Steel Company of Canada (Limited). In the previous year, Dr. A. R. C. Selwyn, F. G. S., Director of the Geological Survey of Canada,¹ made a report on the Acadia iron ore deposits.

In a book entitled "Steel, its Manufacture, Properties and Uses," by J. S. Jeans, Secretary of the Iron and Steel Institution of England,² the following account is given under the head of Canada:—

" *Canada* —The most important enterprise of its kind yet projected " in the Province of Nova Scotia, and perhaps the most important in " the Dominion, is that of the Steel Company of Canada (Limited), at " Londonderry, Colchester County. The Company is composed of a " few English capitalists, with a capital of two and half million dollars. " In October, 1873, the Company purchased the Acadia Iron Mines, " Londonderry, for the purpose of engaging in the manufacture of steel " rails, &c. Operations were commenced in the summer of 1874, and " have since been intermittently carried on. In addition to the purchase of the property, the Company have expended about half a " million dollars in prospecting and raising ore; in the erection of " two large blast furnaces for making coke pig iron; in building two " rotators and a melting furnace, with regenerative gas producers, for " the purpose of making steel direct from the ore by Siemens' direct " process, and in railway works. The Company hold the patent right " in Canada of the Siemens' process, and the inventor of that process " is its chairman."

" About two and a half miles of railway have been constructed to " carry ore from the West mines to the works, and a contract has " recently been let for the building of a branch line from Debert station, " on the Intercolonial Railway, to the East mines, in the Folly Mountain. When this line is completed, the company will own and operate " with their own rolling stock ten miles of railway, while they have " running powers over five miles of the Intercolonial between London-

¹ See Report of Progress, 1872-3.

² Spon., London, 1880, p. 316.

"derry and Debert Station. The Company owns about fifty-five square miles of the County of Colchester, containing a mineral range running east and west thirteen miles, rich in red and brown hematite, spathic and specular ores, and ankerite, besides large deposits of fire-clay. Coal has been discovered on the property, but none raised. For the present the company are drawing their coal supplies from the mines of Springhill and Pictou. The company have turned out castings, iron wheels, rolls, ships knees, and good qualities of steel. Large quantities of charcoal pig iron are on hand, and the charcoal blast furnace has been kept pretty steadily working."

The property was purchased for £82,000 in cash, and £120,000 worth of fully paid up founders shares; they also paid Dr. Siemens £8000 for "the right to use free of royalty his patented processes for the production of iron and steel and their subsequent working into merchantable form."¹

Although the works were built with a view to the manufacture of steel, both cast and spring steel of the very finest description, it was not carried on for any length of time, and a large portion of the plant has since been discarded. Probably the sudden stoppage of the proposed construction of the Canadian Pacific Railway by Sir Hugh Allan, made a change in the product necessary, and the company never made any steel rails, but have turned their attention to bar iron, nail plate, car axles, car wheels, castings and pig iron. Their brand is "Siemens," and the quality of their products is the very best.

Like all pioneer enterprises, they have had a great many difficulties to contend against, and it is much to be regreted that the company are now in liquidation, and their property is for sale. They advertise that their works consist of "two modern blast furnaces, 19 feet bosh, 65 feet high, with Siemens, Cowper & Ford's patent hot blast stoves;² spacious stock houses, and all necessary tracks and rolling stock, 67 bee-hive coke ovens, puddling forge and rolling mill, including car axle plant, capable of manufacturing 10,000 tons of iron per annum, a car wheel foundry of a capacity of 100 wheels per day, machine, pattern and carpenters shops, dwellings, &c. Also the Chignecto and St. George Coal Mines, situated near Maccan, Cumberland County, N.S., together with 1,500 acres of land well timbered. The Chignecto

¹ Mines Report, N.S., 1874, p. 53.

² NOTE.—These stoves were the first set of fire brick stoves erected on the continent of North America. Swank, p. 327.

Mine is fully developed, and thoroughly equipped for raising and delivering 400 tons of coal per day."

HALIFAX IRON WORKS.

In addition to the iron works already mentioned, there is a rolling mill at Halifax, where scrap iron is worked up into nail plate, ships knees, &c., by the Halifax Rolling Mill Company.

PICTOU COUNTY. FORGE AND STEEL WORKS.

The Nova Scotia Forge Company, at Trenton, near New Glasgow, in the County of Pictou, are situated on the East river bank; they have very complete appliances for forging all classes of work out of scrap iron; they make ships knees, steamship and mill shafts, and specially car axles. Probably more work is turned out from this shop than from any other forge in Canada.

The Nova Scotia Steel Company's Works adjoin the forge. These steel works are the only ones in the Dominion; they were completed in 1883, their first cast being made on the 25th July of that year. One 15 ton open hearth Siemens' furnace, gas producers, a re-heating furnace, with two trains of rolls, one 16 and the other 28 inch, complete the steel making plant. The mill is driven by a reversible steam engine of the latest type, and steam is furnished by seven multitubular boilers.

The works have an annual capacity of 9,000 tons, and produce steel plates, bar, spring and machinery steel, from hematite pig and steel scrap. Everything is very compact and complete about the works, which are well situated on the banks of the East river, a short distance below Smelt brook, between the river and the line of the Intercolonial (Pictou and Truro Branch) Railway. Vessels can unload direct into the company's premises, and the railway has a siding into the works, so that shipping facilities by rail or water are equally good. The Pictou Coal Field being only a mile or two distant, fuel is very cheap. A nail factory for cutting steel nails has recently been established in connection with the works.

IMPORTS, EXPORTS
AND
DOMESTIC PRODUCTION
OF
IRON, STEEL, AND COAL.
COMPILED FROM OFFICIAL RETURNS
OF THE
DOMINION OF CANADA.

THE CONSUMPTION OF IRON IN CANADA.

Upon application to the Customs Department, at Ottawa, for Official Returns and Tabulated Statistics of the Imports and Exports of Iron and Steel, and their Manufactures, I was informed "that the "Trade and Navigation Returns" contained all the information in possession of the Department."

A careful study of the annual volumes since Confederation showed, that the classification, methods of entry and customs tariff, had frequently been altered; that in every case the Dutiable, Free, and Specially Exempted articles were not classified with any reference to the process or stages of manufacture but simply alphabetically, (often in connection with other classes of goods,) and in a number of cases the names and groupings of the several articles forming one entry, varied in different years; that in fact, to become of practical value the information therein contained had to be thoroughly sifted, classified, and tabulated. This has been a work involving a very considerable amount of labour, but I trust the information now obtained may be the means of drawing attention to the national importance of the Manufacture of Iron, and may assist in the development of this industry in Canada.

J. H. B.

STANDARD BUILDING,
MONTREAL.

STEEL.

Wrought or Cast.	\$	Free.	341,098	.....	\$	Free.	.....	384,539	.....
TOTAL	.....	.....	341,098	.....	.....	.....	.....	384,539	.....

RAILS.

Rails, Fishplates, Chairs and Spikes	\$	Free.	523,648	.....	\$	Free.	.....	743,516	.....
TOTAL	.....	.....	523,648	.....	.....	.....	.....	743,516	.....

CASTINGS AND FORGINGS.

Anchors	\$	Free.	17,023	.....	\$	Free.	.....	101,281	.....
Chain Cables	\$	Free.	37,497	.....	\$	Free.	.....	133,826	.....
Ships' Iron Knees, Riders, Wire Rigging and Cordage, &c.	\$	Free.	121,239	.....	\$	Free.	.....	7,186	.....
Crank Shafts for Mills and Steamboats (rough)	\$	Free.	3,328	.....	\$	Free.	.....	310,634	.....
Locomotive Engine Frames, Cranks and Crank Axles, &c.	\$	Free.	48,681	.....	\$	Free.	.....	552,927	.....
Locomotive Engine Iron Tyres	\$	Free.	28,662	.....	.....	.....	.....	.....	.....
TOTAL	.....	.....	256,460	.....	.....	.....	.....	.....	.....

CUTLERY, Etc.

Edge Tools, N.E.S.	\$	15 p.c.	14,024	.....	\$	15 p.c.	.....	78,830	11,823.36
Guns, Rifles and Firearms	\$	15 p.c.	14,024	.....	\$	15 p.c.	.....	8,296	1,244.55
Cutlery, all sorts	\$	15 p.c.	14,024		\$	15 p.c.		119,543	17,965.05

TOTAL

.....			14,024		2,100.85		206,669	31,002.96
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HARDWARE, MANUFACTURERS.

Coach and Harness Furniture	\$	15 p.c.	50,215		\$	15 p.c.		63,682	9,552.80
Chandeliers and Gas Fittings	\$	15 p.c.	9,705	.....	\$	15 p.c.	.....	11,939	1,791.10
Nails, Spikes, Tacks, Brads, Spriggs	\$	15 p.c.	.....	.....	\$	15 p.c.	.....	97,719	14,592.18
Stoves and other castings	\$	15 p.c.	29,805	.....	\$	15 p.c.	.....	114,174	17,125.61
Flat Covered Wire	\$	15 p.c.	2,374,678	.....	\$	15 p.c.	.....	16,570	2,485.48
Ironware and Hardware	\$	15 p.c.	2,374,678		\$	15 p.c.		1,726	257,251.19

TOTAL

.....			2,457,403		356,001.89		2,019,110	302,798.42
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IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.	FISCAL YEAR ENDING JUNE 30TH.	1868.				1869.			
		RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
MACHINERY, ENGINES.									
Agricultural Implements (for Agr. Societies).....		Free.	.....	\$ 831	.....	Free.	.....	\$ 2,198	.....
Mowing, Reaping and Threshing Machines.....		15 p.c.	.....	24,246	3,638.20	15 p. c.	566	39,451	3,917.86
Machinery for Mills and Factories.....		Free.	.....	254,519	.....	Free.	.....	306,197	.....
Machinery, N.E.S.....		15 p.c.	.....	182,630	26,988.71	15 p. c.	.....	247,324	37,669.59
Fire Engines, Steam.....		Free.	5	16,092	.....	Free.	.....	3,246	.....
Locomotive Engines and <i>Railway Cars</i>		15 p.c.	.....	33,424	4,807.35	15 p. c.	.....	149,778	22,466.54
Steam Engines, other than Locomotive.....		15 p.c.	.....	17,981	1,506.10	15 p. c.	14	43,720	6,538.04
TOTAL.....				529,723	36,940.36		.....	791,914	72,042.03
COAL.									
Coal and Coke.....		Tons. Free.	356,836	1,377,585		Tons. Free.	389,485	1,398,968	
TOTAL.....			356,836	1,377,585			389,485	1,398,968	

EXPORTS OF THE PRODUCE AND MANUFACTURES OF THE DOMINION OF CANADA.

EXPORTS.	FISCAL YEAR ENDING JUNE 30TH.	1868.			1869.		
		RATE OF DUTY.	QUANTITY.	VALUE.	RATE OF DUTY.	QUANTITY.	VALUE.
Coal.....		Tons.	265,335	640,708	Tons.	440,308	763,262
Iron Ore.....		Tons.	25,312	54,723	Tons.	27,848	60,298
Manganese Ore.....		Tons.	1,017	23,719	Tons.	488	10,809
Pig Iron and Scrap Iron.....		Tons.	7,929	170,728	Tons.	9,371	132,017
Hardware and Iron.....				150,411	.....	.....	122,847
Machinery.....				92,380	.....	.....	65,913
Sewing Machines &c.....		No. ....	.....	52,901	No.	4,840	60,993
TOTAL.....				1,485,570		.....	1,236,199

IMPORTS FOR HOME CONSUMPTION, Etc.—Continued.

IMPORTS. FISCAL YEAR ENDING JUNE 30TH.	1870.				1871.			
	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
IRON.			\$	\$ c.			\$	\$ c.
Pig, Charcoal								
Do, All other								
Scrap and Old								
Blooms and Billets, Slabs and Loops	Free.		1,134,001		Cwts. Free.	643,798	1,452,313	
Galvanized, and Bolts and Spikes Galvanized								
Bars, Puddled			116,007		Free.		218,350	
Tubing, Iron, Brass or Copper Drawn	Free.		1,793,876	89,697 16	5 p. c.		2,449,369	122,468 56
Wire Iron, Brass or Copper	5 p. c.				Free.		91,481	
TOTAL			3,043,884	89,697 16			4,211,513	122,468 56
STEEL.								
Bars or Rod								
Plates cut to any form, but not moulded	Free.		361,139		Free.		506,896	
TOTAL			361,139				506,896	
RAILS.								
Rails, Fishplates and Chairs								
Frogs, Frog Points, Car Axles, Iron and Steel	Free.		917,283		Free.		1,325,021	
TOTAL			917,283				1,325,021	
CASTINGS AND FORGINGS.								
Anchors, Chain Cables, Riders and Sheaves	Free.		179,575		Free.		193,275	
Knees, Deck Plugs and Wedges, Masts, and parts of	Free.		122,392		Free.		83,737	
Crank Shafts for Mills and Steamboats (roughly over 25 lbs	Free.		3,996		Free.		7,223	

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1870.

1871.

Castings and Forgings.—Continued.

Locomotive Engine Frames.....
 do. Axles.....
 do. Iron Tyres.....
 do. Steel.....
 do. Cranks and Crank Axles.....
 do. Pins & Connecting Rods.....
 do. Piston Rods, Slide & Guide Bars.....

TOTAL.....

CUTLERY, Etc.

Axes, Edge Tools, N.E.S., Scythes and Snaths.....
 Hoes, Rakes.....
 Forks.....
 Spades and Shovels.....
 Guns, Rifles and Firearms.....
 Cutlery, all sorts.....

TOTAL.....

HARDWARE, MANUFACTURES.

Coach and Harness Furniture.....
 Chandeliers and Gas Fittings.....
 Nails, Spikes, Tacks, Brads and Sprigs.....
 Stoves and other Castings.....
 Wire, flat covered.....
 Hardware, N.E.S.....

TOTAL.....

	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
	\$		\$	\$ c	\$		\$	\$ c
	Free.		75,073		Free.		133,720	
TOTAL.....			381,036				407,955	
	15 p. c.		77,925	11,687.96	15 p. c.		77,469	11,620.11
	15 p. c.		14,902	2,235.18	15 p. c.		31,814	4,771.56
	15 p. c.		204,261	30,632.51	15 p. c.		240,079	36,010.44
TOTAL.....			297,088	44,555.65			349,362	52,402.11
	15 p. c.		91,539	13,730.56	15 p. c.		131,859	19,777.65
	15 p. c.		17,219	2,582.63	15 p. c.		17,969	2,695.65
	15 p. c.		81,606	12,250.51	15 p. c.		106,867	16,024.89
	15 p. c.		180,463	27,069.62	15 p. c.		204,096	30,617.06
	15 p. c.		16,025	2,403.50	15 p. c.		11,410	1,711.45
	15 p. c.		1,800,430	270,063.15	15 p. c.		2,461,877	369,282.00
TOTAL.....			2,193,342	329,003.37			2,934,108	440,118.70

MACHINERY, ENGINES.

Agricultural Implements (for Agricultural Societies)	No.	Free.	1,316	.....	Free.	1,849	.....
Mowing, Reaping and Threshing Machines	No.	15 p. c.	46,863	740	15 p. c.	56,684	8,503.55
Machinery for construction of Mills	No.	Free.	191,034	.....	Free.	15,218	.....
Do. all other, N.E.S.	No.	15 p. c.	252,536	.....	15 p. c.	508,895	76,330.24
Fire Engines	No.	Free.	695	.....	.....	.....	.....
Locomotive Engines and Railway Cars	No.	15 p. c.	45,790	48	15 p. c.	486,791	73,018.46
Steam Engines, other than Locomotives	No.	15 p. c.	18,461	54	15 p. c.	4,354	653.10
TOTAL			557,095	.....		1,585,065.55	

COAL.

Coal and Coke	Tons.	Free.	279,780	.....	Tons. 50c. per ton to 1st April	244,265	918,288	122,132.82
	"	50 c. p. t. from 1st April.	114,272	.....	Tons. Free from 1st April.	121,808	433,812	.....
TOTAL			394,052	.....		366,073	1,352,100	122,132.82

EXPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1870.

1871.

	RATE OF DUTY.	QUANTITY.	VALUE.	RATE OF DUTY.	QUANTITY.	VALUE.
Coal	Tons.	286,707	588,799	Tons.	318,287	602,451
Iron Ore	Tons.	15,232	34,927	"	26,825	58,048
Manganese Ore	Tons.	1,402	7,682	"	1,466	9,758
Pig Iron and Scrap Iron	Tons.	16,647	294,497	"	16,394	380,337
Hardware and Iron	%	.....	147,931	.....	.....	175,582
Machinery	No.	33,749	116,149	.....	.....	41,851
Sewing Machines	No.	8,392	1,223,734	.....	.....	170,293
TOTAL		.....	1,223,734	.....	.....	1,496,370

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.	1872.				1873.			
	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
IRON.								
Pig Charcoal				\$ c			\$ c	
Do. All other								
Scrap and Old								
Blooms and Billets, Slabs and Loops								
Galvanized, and Bolts and Spikes Galvanized								
Bars Puddled			2,423,851				3,243,845	
Tubing, Iron, Brass or Copper Drawn								
Iron, all other			380,840				531,139	
Wire, Iron or Steel Brass or Copper			3,247,172	162,358.28			4,842,148	242,107.47
Iron for use on Intercolonial Railway			188,949				211,341	
Articles do. International Bridge		875	127,270			57,963	385,689	
			125,961					
TOTAL			6,494,043	162,358.28			9,214,182	242,107.47
STEEL.								
Brass or Rod								
Plates cut to any form, but not moulded		85,701	624,926			68,772	754,319	
TOTAL		85,701	624,926			68,772	754,319	
RAILS.								
Rails								
Fishplates and Chairs								
Frogs, Frog Points			3,005,329				6,891,891	
Car Axles, Iron and Steel								
TOTAL			3,005,329				6,891,891	

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.		1872.				1873.			
FISCAL YEAR ENDING JUNE 30TH.		RATE OF DUTY.	QUAN. ITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
MACHINERY, ENGINES.				\$	\$			\$	\$
Agricultural Implements (for Agricultural Societies)		Free.	.....	2,420	.....	Free.	.....	2,457	.....
Mowing and Reaping and Threshing Machines		No. 15 p. c.	1,149	52,186	7,827.71	No. 15 p. c.	1,704	63,250	9,486.79
Machinery for construction of Mills, to be used in any Canadian manufactory, and not then manufactured in Canada.		Free.	.....	239,021	.....	Free.	.....	419,853	.....
Do, all other, N.E.S.		15 p. c.	.....	570,547	85,584.26	15 p. c.	.....	816,422	122,403.18
Locomotive Engines and <i>Railway Cars</i>		No. 15 p. c.	82	408,772	61,315.68	No. 15 p. c.	313	1,623,902	243,585.24
Steam Engines, other than Locomotives.		No. 15	31	27,739	4,160.78	No. 15	82	48,818	7,322.49
TOTAL.....				1,320,694	158,888.43			2,974,702	382,857.70
COAL.									
Coal and Coke		Tons. Free.	484,826	2,015,247	.....	Tons. Free.	574,308	2,558,723	.....
TOTAL.....			484,826	2,015,247	.....		574,308	2,558,723	.....
EXPORTS.									
FISCAL YEAR ENDING JUNE 30TH.		RATE OF DUTY.	QUANTITY.	VALUE.		RATE OF DUTY.	QUANTITY.	VALUE.	
Coal		Tons.	295,322	578,691		Tons.	404,757	951,886	
Iron Ore		"	26,175	64,904		"	47,200	112,300	
Manganese Ore		"	1,206	28,500		"	838	17,171	
Pig Iron and Scrap Iron		"	32,045	546,624		"	26,000	752,682	
Hardware and Iron		\$	.....	195,720		\$	.....	307,057	
Machinery		\$	.....	105,548		\$	.....	66,336	
Sewing Machines		No.	19,273	227,964		No.	34,558	366,231	
TOTAL.....				1,747,651				2,573,720	

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

FISCAL YEAR ENDING JUNE 30TH.		1874.			1875.			
	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
IRON.								
Pig, Charcoal. Do. All other.....	\$	Free.	1485,861	\$	Cwts. Free.	991,911	1,229,980	\$
Scrap and Old.....								
Bars, Puddled.....	\$	5 per cent.	3,442,431	175,171.00	Tons. 5 p. c.	7,235	217,086	5 p. c.
Do. and Rod, Hoop and Sheet.....								
Nail and Spike Rod.....								
Roller Plate and Boiler Plate.....								
Canada Plates and Tinned Plates.....	\$	5 per cent.	3,442,431	175,171.00	Tons. 5 p. c.	41,076	2,304,049	118,202.98
Galvanized.....								
Tubing, Plain, threaded, coupled, or not, including Brass or Copper.....								
Wire, Iron, Brass or Copper.....								
TOTAL.....								
STEEL.								
Bars or Rod, Plates cut to any form, but not moulded.....	Cwts. Free.	90,354	679,863		Cwts. Free.	85,254	575,032	
TOTAL.....								
RAILS.								
Steel Rails, Iron Rails, Iron Fishplates and Chairs, Steel Fishplates, Frogs, Frog Points, Car Axles, Iron and Steel, Car Wheels, Do.....	\$	Free.	4,326,695		Cwts. Free.	1,631,494	5,287,861	
TOTAL.....								
CASTINGS AND FORGINGS.								
Anchor.....	Cwts. Free.	36,965	399,205	1,278.60	5 p. c.	1,631,494	5,287,861	3,816.80
Chain Cables.....								
Riders and Knees.....								
Deck Plugs and Wedges.....								
Masts, and parts of.....	Cwts. Free.	797	1,490		Cwts. Free.	1,555	11,684	
Crank Shafts for Mills and Steamboats (rough).....	Cwts. 10 p. c.	72,929	18,103	1,810.19	Cwts. 10 p. c.	1,555	10,845	
Locomotive Engine, Frames and Axles.....	Cwts. Free.	72,929	1,067,339		Cwts. 10 p. c.	1,555	38,160	3,816.80
TOTAL.....								

CASTINGS AND FORCINGS.

[illegible]

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

FISCAL YEAR ENDING JUNE 30TH.	1874.				1875.			
	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
CUTLERY, Etc.								
Axes	15 p. c.	.....	114,837	\$ 18,050.38	17½ p. c.	.....	23,719	\$ 4,148.55
Edge Tools, N.E.S.	15 p. c.	.....	.....	.....	17½ "	.....	50,741	\$ 8,880.36
Scythes and Snaths, Hoes, Rakes and Forks	15 p. c.	.....	.....	.....	17½ "	.....	43,171	\$ 7,554.79
Spades and Shovels	15 p. c.	.....	.....	.....	17½ "	.....	33,721	\$ 5,900.44
Guns, Rifles and Firearms	15 p. c.	.....	102,583	\$ 13,005.43	17½ "	.....	96,468	\$ 16,882.72
Cutlery, all sorts	15 p. c.	.....	635,562	\$ 100,506.20	17½ "	.....	356,447	\$ 62,381.90
TOTAL .....	.....	.....	853,412	\$ 131,562.01	.....	.....	604,267	\$ 105,748.76
HARDWARE, MANUFACTURES.								
Bolts and Spikes, galvanized .....	.....	.....	.....	.....	Tons. 5 p. c.	61	6,948	\$ 347.37
Coach and Harness Furniture .....	.....	.....	151,274	\$ 23,468.23	17½ "	.....	142,975	\$ 25,022.25
Chandeliers and Gas Fittings .....	.....	.....	53,473	\$ 8,340.81	17½ "	.....	68,801	\$ 12,043.93
Tacks, Brads and Sprigs .....	.....	.....	.....	.....	.....	.....	.....	.....
Nails, Hungarian and Clout .....	.....	.....	.....	.....	.....	.....	.....	.....
Do. Iron Wire, "Pointes de Paris" .....	.....	.....	.....	.....	.....	.....	.....	.....
Do. Spikes and Sheathing Nails, composition .....	.....	.....	223,388	\$ 33,869.76	17½ p. c.	.....	298,747	\$ 52,283.90
Do. and Spikes, wrought and pressed, including Railroad Spikes .....	.....	.....	.....	.....	.....	.....	.....	.....
Nails and Spikes, Cut .....	.....	.....	737,197	\$ 117,607.84	17½ "	.....	651,386	\$ 113,991.93
Stoves and other Iron Castings .....	.....	.....	4,294	\$ 662.07	17½ "	.....	326	\$ 57.05
Wire, flat covered .....	.....	.....	.....	.....	Free.	.....	141,350	\$
Do. or Rigging for Ships, and Wire for Do. ....	.....	.....	.....	.....	.....	.....	3,405,835	\$ 596,066.92
Hardware, " " N.E.S. ....	.....	.....	3,618,057	\$ 556,971.62	17½ p. c.	.....	357,596	\$ 62,585.22
Manufactures of Iron, all other, N.E.P.F. ....	.....	.....	.....	.....	17½ "	.....	28,030	\$ 1,401.21
Pumps and Pumping Gear .....	.....	.....	11,537	\$ 536.90	5 "	.....	.....	.....
TOTAL .....	.....	.....	4,790,190	\$ 741,457.23	.....	.....	5,101,994	\$ 863,799.78

MACHINERY, ENGINES.

	1874.		1875.		RATE OF DUTY.	QUANTITY.	VALUE.
	QTY.	VAL.	QTY.	VAL.			
Agricultural Implements (for Agricultural Societies)		2,230	.....	2,387	Free.	.....	2,387
Mowing and Reaping Machines		49,783	.....	43,416	17½ p. c.	975	7,599.72
Threshing Machines		55,683	.....	173,880	10 "	.....	17,387.83
Machinery for Mills and Factories		337,079	.....	172,110	Free.	.....	172,110
Do. to be used in any Canadian manufactory and not then manufactured in Canada to 1st January, 1875		910,893	.....	733,786	17½ p. c.	.....	128,282.00
Machinery, all other N.E.S. wholly or in part Iron.		473	.....	181,449	17½ "	217	31,386.77
Locomotive Engines and Railway Cars		58	.....	124,361	17½ "	65	21,810.56
Steam Engines, other than Locomotives		3,092,622	.....	1,431,380	.....	.....	206,476.88
TOTAL		804,827	.....	3,076,088	.....	.....	.....

COAL.

	1874.	1875.
Anthracite		
Bituminous		
All other, and Dust		
Coke		
TOTAL		

EXPORTS.

	1874.		1875.		RATE OF DUTY.	QUANTITY.	VALUE.
	QTY.	VAL.	QTY.	VAL.			
Coal		418,357	.....	937,923	Tons.	288,176	.....
Iron Ore		44,278	.....	75,917	"	32,443	.....
Manganese Ore		975	.....	13,716	"	577	.....
Pig Iron		81,991	.....	234,652	"	13,913	.....
Scrap Iron		252,114	.....	197,180	Do.	.....	.....
Do. Hardware and Iron		38,769	.....	40,763	Do.	.....	.....
Machinery		23,401	.....	254,510	No.	21,832	.....
Sewing Machines		23,401	.....	1,754,661	.....	.....	.....
TOTAL		2,307,800	.....	.....	.....	.....	.....

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1876.

1877.

IRON.

	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
		\$.	¢.			\$.	¢.
Pig, Charcoal. Do. All other.....	623,847	570,648	.....	Cwts. Free.	710,328	677,935	.....
Scrap and Old.....	6,214	7,502	375.16	" 5 p. c.	6,503	4,616	230.77
Blooms and Billets, Slabs and Loops.....	7,165	21,566	1,078.30	" 5 "	36	145	7.25
Bars, Puddled.....	64,074	111,062	5,553.13	" 5 "	103,166	157,116	7,855.79
Do. and Rod.....	581,377	1,426,063	71,300.21	" 5 "	649,949	1,197,280	59,803.92
Hoop and Sheet.....	15,187	109,165	5,458.37	" 5 "	109,767	269,169	13,455.46
Galvanized.....	28,867	70,424	3,521.20	" 5 "	42,265	81,218	4,000.91
Nail and Spike Rod.....	15,460	59,146	2,957.27	" 5 "	36,213	109,573	5,478.66
Boiler Plate and Rolled Plate.....	134,088	729,949	36,507.52	" 5 p. c.	68,113	191,324	9,566.24
Canada ".....	58,869	266,695	.....	" 5 "	102,683	325,853	26,292.62
Timed ".....	27,426	135,769	6,788.80	Cwts. Free.	23,798	160,560	8,027.99
Tubing and Piping drawn, including Brass & Copper.....	.....	.....	.....	17 p. c.	.....	52,635	9,211.48
Tubing, Iron (old tariff).....	.....	.....	.....	Cwts. Free.	44,725	180,660	.....
Wire, Iron or Steel.....	.....	.....	.....	" 5 p. c.	37,515	164,794	8,239.97
TOTAL.....	3,507,929	133,539.90	.....	.....	.....	3,781,818	152,291.06

STEEL.

Bars or Rod.....	67,876	384,105	.....	Cwts. Free.	61,132	360,106	.....
Plates cut to any form, but not moulded.....	.....	.....	.....	"	11,688	71,368	.....

RAILS.

Steel Rails.....	67,876	384,105	.....	Cwts. Free.	72,840	431,474	.....
Iron Rails.....	.....	.....	.....	"	.....	.....	.....
Iron Fishplates and Chairs, and Steel Fishplates.....	1,573,777	3,897,770	.....	Cwts. Free.	658,643	1,336,490	.....
Frogs, Frog Points.....	.....	.....	.....	"	335,936	510,973	.....
Car Axles, Iron and Steel.....	.....	.....	.....	"	46,960	90,442	.....
.....	.....	.....	.....	"	723	10,878	.....
.....	.....	.....	.....	"	6,106	17,338	.....
TOTAL.....	1,573,777	3,897,770	.....	.....	1,048,368	1,966,116	.....

1,048,368 1,966,116 .

CASTINGS AND FORCINGS.

Anchors.....	
Chain cables, over $\frac{1}{2}$ inch.....	
Riders and sheaves.....	
Knees	}
Masts, and parts of	
Crank Shafts for Mills and Steamboats (rough) over 25 lbs.....	
Locomotive Engine Frames.....	
Do. Axles	
Do. Iron Tyres.....	
Do. Steel ".....	
Do. Cranks and Crank Axes.....	
Do. Pins & Connecting Rods.....	
Do. Piston Rods, Slide & Guide Bars.....	

TOTAL.

CUTLERY, ETC.

Axes.....
Edge Tools, N.E.S.....
Soythies and Snaths.....
Hoes.....
Rakes.....
Forks.....
Spades and Shovels.....
Guns, Rifles, Firearms.....
Files and Rasps.....
Surgical Instruments.....
Cutlery, all sorts.....

Total.

HARDWARE, MANUFACTURES.

Axles, all sorts, except Railroad and Car
Bolts and Spikes, galvanized.....
Coach and Harness Furniture
Chandeliers and Gas Fittings.....
Locks, all kinds.....

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1876.

1877.

	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
			\$	\$			\$	\$
Hardware, Manufactures.—Continued.								
Tacks, Brads and Spriggs.....								
Nails, Hungarian and Clout.....								
Do. Iron Wire, "Pointes de Paris".....								
Do. Spikes and Sheathing Nails, composition.....								
Do. and Spikes, wrought and pressed, including Railroad Spikes.....	17½ p.c.		228,752	40,035.12	17½ p.c.		202,922	35,462.06
Nails and Spikes, Cut.....								
Screws, Iron, Steel and Wood.....								
Stoves and other Iron Castings.....	17½ p.c.				17½ "		50,979	8,921.81
Wire Rope or Strand (including flat covered).....	17½ "		393,630	68,895.87	17½ "		414,937	72,621.82
Do. do. or Rigging for Ships, and wire for do.....	Free.		29	5.08	17½ "		78	13.66
Hardware, N.E.S.....	17½ p.c.		104,012		Free.	16,713	89,330	
Manufactures of Iron, all other, N.E.P.F.....	17½ "		2,401,256	420,246.69				
Pumps and Pumping Gear.....	17½ "		227,445	39,811.93	17½ p.c.		2,127,926	372,441.62
	5		9,249	462.45	5		8,083	404.19
TOTAL.....			3,535,946	598,320.87			3,128,839	530,175.40
MACHINERY, ENGINES.								
Agricultural Implements (for Agricultural Societies).								
Do. N.E.S.....	Free.		1,856		17½ p.c.		694	
Chaf Cutters.....	17½ p.c.		11,842	2,072.86	17½ "		20,490	3,586.17
Cultivators, and parts of, and Corn Huskers.....	17½ p.c.		473	82.77	17½ "	33	263	46.09
Ploughs,.....	17½ "		13,595	2,379.75	17½ "		504	88.01
Mowing and Reaping Machines.....	No.		38,396	6,719.58	17½ "		22,780	3,986.64
Threshing Machines.....	No.	658			17½ "	640	40,483	7,074.67
Sewing.....	No.	2,700			17½ "		138,843	24,298.44
Machinery for Mills and Factories.....	No.		265,415	26,541.77	10		150,854	15,085.02
Machinery, all other, N.E.S., wholly or in part Iron.	17½ "		392,386	68,664.28	17½ "		351,847	61,579.58

Fire Extinguishers, Chemical.....

Fire Extinguishers, Chemical.....	No.	17 1/2	"	47	1,721	301,29
Do. Engines, steam.....	No.	17 1/2	"	6	16,231	2,840,43
Do. do. other.....	No.	17 1/2	"	7	2,761	483,19
Locomotive Engines.....	No.	17 1/2	"	33	174,847	30,368,28
Steam Engines, other than Locomotives.....	No.	17 1/2	"	8	24,863	4,351,03
TOTAL.....					947,151	154,318,87

COAL.

Anthracite.....	Tons.	Free.		420,010	1,793,407	
Bituminous.....	"	"		513,970	1,706,154	
All other, and Dust.....				45,712	161,367	
TOTAL.....				979,692	3,660,928	

EXPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1876.

		RATE OF DUTY.	QUANTITY.	VALUE.
Coal.....	Tons.		277,832	977,188
Iron Ore.....	"		14,286	30,702
Manganese Ore.....	"		4,355	4,355
Pig Iron.....	"		11,356	196,928
Scrap Iron.....	"			
Other Castings.....	"			
Do. Hardware and Iron.....	"			
Machinery.....	No.		31,124	305,749
Sewing Machines.....	"			
Steel, and Manufactures of.....	"			
TOTAL.....				1,670,513

1877.

		RATE OF DUTY.	QUANTITY.	VALUE.
Coal.....	Tons.		249,536	855,968
Iron Ore.....	"		7,555	14,854
Manganese Ore.....	"		720	13,568
Pig Iron.....	"		3,046	35,472
Scrap Iron.....	"			
Other Castings.....	"			
Do. Hardware and Iron.....	"			
Machinery.....	No.		26,086	260,115
Sewing Machines.....	"			
Steel, and Manufactures of.....	"			
TOTAL.....				1,430,626

IMPORTS FOR HOME CONSUMPTION, Etc.—*Cont. med.*

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1878.

1879.

IRON.

	RATE OF DUTY.	VALUE.	DUTY.	QUANTITY.	VALUE.	DUTY.
		\$	\$ c.		\$	\$ c.
Pig Charcoal. Do. All other.....		601,865	488,824		310,069	231,811
Scrap and old.....	Cwts. Free.	8,414	3,433	10,67	8,304	504.31
Blooms and Billets, Slabs and Loops.....	" 5 p. c.	45	142	172	391	19.55
Bars Puddled.....	" 5 "	27,261	28,172	710	5,622	984.25
Do. and Rod. Rolled or Hammered.....	" 5 "	600,658	1,009,448	563,511	893,750	75,130.79
Nail and Spike Rod.....	" 5 "	27,590	47,775	13,941	28,624	2,348.97
Boiler Plate and Rolled do.....	" 5 "	33,083	91,465	45,481	102,292	7,332.58
Canada do.....	" 5 "	45,880	134,660	40,308	98,352	5,708.90
Tinned do.....	" 5 "	85,116	418,969	93,349	425,973	26,617.44
Galvanized.....	" 5 "	20,767	124,497	15,775	90,503	4,325.15
Hoop No. 17 gauge or thinner (and Band).....						
Do. do. Over No. 17 gauge.....	Cwts. 5 "	103,952	227,164	89,282	206,001	15,255.86
Sheet, No. 17 gauge or thinner. { smooth or polished, coated or galvanized common or black... }						
Do. Over No. 17 gauge.....	Cwts. 17 1/2 p. c.	80,600	232,832		172,262	27,553.33
Tubing, Plain, not threaded, coupled or manufactured, over 2 ins. diameter. Tubing, threaded, coupled or otherwise, manufactured, over 2 ins. diameter. Tubing, Plain, threaded, coupled, or not, 2 ins. dia. or under.....	" 5 "	31,062	130,230		118,678	10,034.26
Wire, Iron or Steel.....	" 5 "				96,711	15,379.85
Iron, All other.....						
TOTAL.....		2,087,950	151,547.25		2,478,074	190,805.24

STEEL.

Bars or Rods.....	Cwts. Free.	78,176	324,879	79,983	347,992	
Plates cut to any form, but not moulded.....	" "	12,066	68,194			
Logots, Bars, Sheets or Coils.....						
TOTAL.....		90,242	393,073	79,983	347,992	

RAILS.

Steel Rails.....	544,094	1,049,107	.....	(Wts. Free.	474,375	783,555
Iron Rails.....	202,686	285,056	.....	"	136,809	201,775
Do. Fishplates and Chairs.....	27,300	49,449	.....	"	26,444	61,382
Steel ".....	738	8,379	.....	"	1,618	2,809
Frogs, Frog Points, and Finger Bars.....	4,197	11,830	.....	"	639,246	1,049,881
Car Axles, Iron and Steel.....	779,024	1,403,821	.....	.....	.....	.....
TOTAL.....	.....	.....	.....	.....	.....	.....

CASTINGS AND FORGINGS.

Anchors.....	11,457	43,965	.....	(Wts. Free.	10,106	34,470
Chain Cables (over 1/2 inch dia.).....	37,136	110,217	.....	"	19,073	52,316
Riders, Sheaves and Knees.....	5,340	17,087	.....	"	.....	2,300
Masts, and parts of.....	1,779	6,438	.....	"	1,240	4,707
Crank Shafts for Mills and Steamboats (rough) over 25 lbs.....	753	4,948	.....	"	670	4,083
Locomotive Engine Frames.....	.....	11,037	.....	.....	.....	.....
Do. Axles.....	.....	3,928	.....	.....	.....	.....
Do. Iron Tyres.....	.....	11,713	.....	.....	.....	.....
Do. Steel ".....	.....	1,230	.....	.....	.....	.....
Do. Cranks and Crank Axles.....	.....	1,589	.....	.....	.....	.....
Do. " Pins & Connecting Rods.....	.....	1,173	.....	.....	.....	.....
Do. " Piston Rods, Slide & Guide Bars.....	.....	333,457	.....	.....	.....	.....
Other Castings and Forgings.....	.....	546,811	.....	.....	.....	.....
TOTAL.....	.....	62,288.32	.....	.....	.....	.....

CUTLERY, ETC.

Axes.....	29,030	5,080.85	.....	(Wts. 17 1/2 p.c.	18,261	3,427.80
Edge Tools, N.E.S.....	47,688	8,345.84	.....	"	.....	.....
Scythes and Snaths.....	45,077	7,889.30	.....	"	.....	.....
Hoes, Rakes and Forks.....	28,909	5,059.70	.....	"	.....	.....
Spades and Shovels.....	34,529	6,043.12	.....	"	.....	.....
Guns, Rifles and Firearms.....	69,446	12,155.75	.....	"	.....	.....
Files and Rasps.....	54,531	9,543.34	.....	"	.....	.....
Surgical Instruments.....	11,044	1,933.12	.....	"	.....	.....
Cutlery, all sorts.....	240,258	42,046.50	.....	"	.....	.....
TOTAL.....	500,512	98,097.52	.....	.....	.....	.....

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

FISCAL YEAR ENDING JUNE 30TH.	1878.			1879.		
	RATE OF DUTY.	QUANTITY.	VALUE.	RATE OF DUTY.	QUANTITY.	VALUE.
IMPORTS.						
HARDWARE, MANUFACTURES.						
Axles, all sorts, except Railroad and Car.		2088	5,741			
Do. and Spikes, galvanized.	17½ p.c.	2,291	8,226	Cwts.	3,736	21,744
Coach and Harness Furniture.	"		116,612	5 p.c.		5,757.33
Chandeliers, and Gas Fittings.	17½ "		84,858	17½ "		86,924
Locks, all kinds.	17½ "		56,179	17½ "		15,214.06
Tacks, Brads and Spriggs.	17½ "			17½ "		37,853
Nails, Hungarian and Clout.						7,517.15
Do. Ironwire, "Pointes de Paris".						
Do. Spikes and Sheathing Nails, composition.	17½ "		172,574	17½ "		156,445
Do. and Spikes, wrought and pressed, including Railroad Spikes.						31,217.72
Nails and Spikes, Cut.						
Screws, Iron, Steel and Wood.	17½ "		18,737	17½ "		62,470
Stoves and other Iron Castings.	17½ "		59,319	17½ "		34,212
Wire Rope or Strand (including flat covered).	17½ "		85	17½ "		6,262.52
Do. do. or Rigging for Ships, and Wire for Do.	Free.	14,262	78,336	Free	10,065	50,164
Manufactures of Iron, all other, N.E.P.F.	17½ p.c.		2,167,244	17½ "		1,732,544
Pumps and Pumping Gear.	Cwts.		9,857	Cwts.		325,677.54
TOTAL.			2,777,768			4,130
			470,204.64			206.50
						2,206,486
						463,957.32
MACHINERY, ENGINES.						
Agricultural Implements (for Agricultural Societies)						
Do. do. N.E.S.	Free.		1,901	Free.		1,154
Bone Crushers and Chaff Cutters.	17½ p.c.		20,676	17½ p.c.		30,089
Cultivators, or parts of, and Corn Huskers.	17½ "		576	17½ "		61
Ploughs	17½ "		565	17½ "		550
Mowing and Reaping Machines.	17½ "		27,304	17½ "		59,126
Threshing Machines.	17½ "	588	43,990	17½ "	563	39,096
			7,698.25			7,145.64

Sewing Machines..... No. 173 " 6,908 101,404 17,746.52

Sewing Machines.....	No.	17 1/2	6,208	101,404	17,746.53	No.	17 1/2	9,262	136,262	27,535.19
Machinery for Mills and Factories.....	%	10		154,454	15,445.45	%	10		111,269	11,371.91
Do. not made in Canada, for Worsteds and Cotton Mills.....	Free.						Free.		18,844	
Machinery, all other, N.E.S., wholly or in part Iron.....	No.	17 1/2 p.c.	16	283,633	49,638.32	No.	17 1/2 p.c.		292,540	58,688.65
Fire Extinguishers, Chemical.....	No.	17 1/2	330	37.67	37.67	No.	17 1/2	9	445	88.45
Do. Engines.....	No.	17 1/2	4	13,439	2,351.83	No.	17 1/2	5	14,572	2,550.11
Other " and Boilers.....	No.	17 1/2	4	845	147.88	No.	17 1/2	3	1,657	343.45
Locomotive Engines.....	No.	17 1/2	22	119,315	20,880.05	No.	17 1/2	45	242,267	49,694.36
Steam Engines, other than Locomotives.....	No.	17 1/2	18	10,041	1,571.19	No.	17 1/2		13,220	2,829.35
TOTAL.....				778,671	124,354.03				951,692	178,682.73

COAL.

Anthracite.....	Tons.	Free.	406,971	1,476,026		Tons.	Free to 15th March.	416,423	1,506,598	46,947.81
Bituminous.....	"	"	456,090	1,493,169		"	50 cts. p. ton from 15th March.	473,317	1,420,264	38,986.39
All other, and Dust.....	"	"	31,757	85,651		"	To 15th March...	20,439	53,963	3,470.49
Coke.....	"	"	1,648	7,304		"		965	4,386	
TOTAL.....			896,446	3,062,150				911,174	2,985,241	109,404.69

EXPORTS.

FISCAL YEAR ENDING JUNE 30TH.

	1878.		1879.	
	RATE OF DUTY.	QUANTITY.	RATE OF DUTY.	QUANTITY.
Coal.....	Tons.	340,127	Tons.	315,793
Iron Ore.....	"	5,421	"	3,562
Manganese Ore.....	"	1,066	"	589
Pig Iron.....	%		%	68
Scrap Iron.....	%		%	37,498
Stoves.....	%		%	5,270
Other Castings.....	%		%	13,555
Do. Hardware and Iron.....	%		%	81,963
Machinery.....	%		%	54,265
Sewing Machines.....	No.	30,429	No.	26,796
Agricultural Implements.....	No.		No.	79,911
Steel, and Manufactures of.....	No.		No.	34,672
TOTAL.....		1,872,747		1,482,993

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1880.

1881.

IRON.

	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
Pig Charcoal, Do. All other.....	Tons, \$2 per ton.	23,159	371,556	46,320.20	Tons, \$2 per ton.	43,630	715,997	87,293.44
Scrap and old.....	Tons, \$2 per ton.	928	14,942	1,857.14	Tons, \$2 per ton.	584	8,807	1,107.98
Blooms and Billets, Slabs and Loops.....	Cwt, 12½ p.c. 10 p.c.	195,572	244,601	27,297.85	Cwts, 10 p.c.	111,066	111,374	11,137.46
Bars and Rod, Rolled or Hammered.....	" 17½ p.c.	535,315	897,135	157,004.07	" 17½ p.c.	601,282	926,361	162,128.70
Nail and Spike Rod.....	Cwts, 17½ p.c.	12,208	25,406	4,446.97	Cwts, 17½ p.c.	11,633	18,966	3,319.32
Rolled Beams, Angle, Tee and Channel Bars, Iron, or, and Steel.....	" 15 "	13,615	28,238	4,235.70	(15 p.c. to 26th)			
Boiler Plate.....	" 12½ "	58,125	159,350	19,953.33	Cwts, 12½ p.c.	27,614	60,333	8,646.16
Canada do.	" 12½ "	49,332	134,210	16,769.63	Cwts, 12½ p.c.	66,343	178,259	22,200.56
Tinned do.	" 10 "	97,959	529,091	52,909.85	" 10 "	63,944	176,772	21,346.86
Hoop No. 17 gauge or thinner and Band.....	" 12½ "	22,869	72,273	9,035.39	" 12½ "	17,512	71,706	7,170.80
Do. Do. Over No. 17 gauge.....	" 17½ "	20,569	96,157	6,327.67	" 17½ "	24,135	52,031	6,504.40
Sheet, No. 17 gauge or thinner (smooth or polished, coated or galvanized, common or black.)	" 12½ "	61,515	232,582	29,051.33	" 12½ "	44,271	115,753	14,747.79
Do. Over No. 17 gauge.....	" 17½ "	39,410	89,288	13,025.76	" 17½ "	64,239	215,753	29,069.90
Tubing, Plain, not threaded, coupled or manufactured, (over 2 ins. diameter).....	Cwts, 10 p.c. to 10 March, 15 p.c. after	65,641	198,831	23,612.59	" 15 p.c.	57,758	75,512	12,895.10
Tubing, threaded, coupled or otherwise, manufactured, (over 2 ins. diameter).....	Cwts, 20 p.c.	31,950	92,544	15,308.80	" 20 "			
Tubing, Plain, threaded, coupled, or not, 2 ins. dia. or under.....	Cwts, 15 p.c.	62,495	255,481	38,310.65	(From 26th Feb.)			
Wire, Iron or Steel.....	" 10 "		1,176	11,755	Cwts, 15 p.c.	92,891	64,122	16,022.59
Wire, Rods in Coils under ½ in dia. rolled.....	" 17½ "	1,143	2,635	472.12	" 10 "	5,888	371,483	55,728.32
Iron, all other.....					" 17½ "	914	1,000.40	
TOTAL.....			3,384,876	471,851.50			2,540	444.58

STEEL.

Ingot, Bars, Sheets or Coils.....	Cwts, Free.	179,837	654,874		Cwts, Free.	266,226	793,329	
Steel for manufacture of Skates.....	" "				" "	692	4,358	
TOTAL.....		179,837	654,874			266,918	797,687	

RAILS.

Steel Rails	Cwts.	Free.	1,539,603	213,262	.....	Free.	1,792,908	297,688	.....
Chain Rails	"	15 p.c.	2,858	10,073	151,114	15 p.c.	4,741	11,379	1,706,85
Fishplates, Chairs, Frogs, Frog-points and Finger bars	"	17½ "	1,923	8,240	143,880	17½ "	992	3,801	665,19
Steel "	"	Free.	42,281	95,351	.....	Free.	74,893	146,514	.....
Car Axles, Car Wheels, Iron and Steel	"	25 p.c.	.....	78,935	19,739,48	25 p.c.	11,577	34,047	851,225
TOTAL .....	.....	.....	.....	234,523	226,804,42	.....	.....	317,2829	10,884,29

CASTINGS AND FORGINGS.

Anchors	Cwts.	Free.	6,103	21,811	.....	Free.	6,495	23,802	.....
Chain Cables (over ½ inch dia.) (over 9-16 inch dia.)	"	5 p.c.	.....	76,466	3,824,37	5 p.c.	29,536	83,783	419,155
Do. All other	"	20 "	.....	46,497	9,302,63	20 "	18,894	61,225	12,251,42
Masts, and parts of	"	Free.	.....	5,980	.....	Free.	422	9,923	.....
Crank Shafts for Mills and Steamboats (rough) over 25 lbs	"	20 p.c.	.....	7,292	145,843	20 p.c.	.....	5,165	1,632,25
Locomotive Engine Tyres, Steel	"	10 "	.....	46,711	4,855,15	10 "	7,344	29,653	2,965,30
Malleable Iron Castings	"	25 "	.....	21,765	5,442,21	25 "	.....	23,437	5,804,27
Cast " Gas, Water and Soil Pipe	"	25 "	.....	40,419	10,105,10	25 "	.....	55,676	13,917,56
Other Castings	"	25 "	.....	178,034	44,521,78	25 "	.....	223,323	55,836,65
TOTAL .....	.....	.....	.....	444,975	79,509,67	.....	.....	508,478	96,000,00

CUTLERY, Etc.

Axes .....	.....	.....	.....	7,929	237,658	.....	.....	6,724	2,017,47
Edge Tools, N.E.S.	30 p.c.	.....	.....	25,971	7,793,49	30 p.c.	.....	13,270	3,982,14
Scythes	30 "	.....	.....	25,994	7,797,85	30 "	.....	42,581	12,774,17
Hoes, Rakes, Forks, Spades and Shovels	30 "	.....	.....	49,811	14,944,82	30 "	.....	46,949	14,088,93
Guns, Rifles and Firearms	20 "	.....	.....	54,195	10,841,01	20 "	.....	79,380	15,376,27
Files and Rasps	30 "	.....	.....	58,868	17,090,18	30 "	.....	63,748	19,123,81
Pen and Jack Knives	20 "	.....	.....	12,339	2,496,89	20 "	.....	22,409	4,481,82
Needles, Knitting and all other	20 "	.....	.....	38,731	7,748,26	20 "	.....	54,929	10,688,65
Surgical Instruments	20 "	.....	.....	9,830	1,906,50	20 "	.....	14,446	2,891,51
Saws	30 "	.....	.....	26,613	7,984,58	30 "	.....	39,480	11,844,41
Carpenters' and other Mechanics' Tools	30 "	.....	.....	144,233	43,284,29	30 "	.....	199,202	59,753,35
Knife Blades in Blank	10 "	.....	.....	145	14,50	10 "	.....	5	0,50
Cutlery, all sorts	20 "	.....	.....	280,200	56,048,96	20 "	.....	334,576	66,917,27
TOTAL .....	.....	.....	.....	734,859	180,927,91	.....	.....	917,669	224,812,50

IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

IMPORTS.

FISCAL YEAR ENDING JUNE 30TH.

1880.

1881.

	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.
			\$	\$			\$	\$
HARDWARE, MANUFACTURES.								
Anvils	Cwts. 30 p. c.	912	5,895	1,746.72	Cwts. 30 p. c.	938	7,384	2,215.47
Bedsteads and Iron Furniture, etc.	25 "	.....	3,690	925.50	25 "	.....	7,126	1,781.50
Belts, Washers and Rivets	30 "	.....	124,708	37,416.21	30 "	.....	83,277	24,982.75
Builders', Cabinet-makers' and other Hardware....	30 "	.....	405,972	121,812.41	30 "	.....	470,630	141,000.05
Hollowware, Tinned, Enamelled or Glazed	25 "	.....	47,227	11,806.01	25 "	.....	68,108	17,041.98
Horse Shoes and Horse Shoe Nails	30 "	.....	2,730	820.29	30 "	.....	2,925	878.15
Iron Bridges and Structural Work	Cwts. 25 "	24,808	109,076	27,269.00	Cwts. 25 "	84,166	420,410	105,169.70
Locks, all kinds	30 "	.....	43,177	12,957.70	30 "	.....	50,250	15,039.15
Nails, Brad's and Sprigs	30 "	.....	5,452	1,634.92	30 "	.....	5,355	1,604.58
Nails, Hungarian and Clout	30 "	.....	3,903	1,171.78	30 "	70,831	3,725	1,120.35
Do, Iron Wire, "Pointes de Paris"	Lbs. 30 "	38,136	1,488	446.61	Lbs. 30 "	99,294	4,642	1,392.00
Do, Spikes and Sheathing Nails, composition....	" 20 "	36,624	5,823	1,192.35	" 20 "	65,273	11,791	2,558.16
Do, and Spikes, wrought and pressed, including Railroad Spikes	p. lb. & 10 p. c.	1,110,924	37,121	12,047.99	p. lb. & 10 p. c.	421,408	16,782	4,835.60
Nails and Spikes, Cut	" "	779,261	27,768	6,674.85	" "	275,270	12,791	2,655.81
Nuts	" "	192,201	8,806	2,804.80	" "	90,134	5,316	1,433.09
Safes, and Doors for Safes and Vaults .....	" "	.....	6,523	1,630.84	" "	.....	9,855	2,458.75
Scales, Balances and Weigh Beams	30 "	.....	26,074	7,823.06	30 "	.....	46,328	13,806.52
Screws, Iron, Steel and Wood	Lbs. 35 "	953,334	85,911	30,062.28	Lbs. 35 "	.....	52,139	11,238.38
Skates, Iron and Steel	Pairs. 30 "	16,371	13,969	4,189.05	Pairs. 30 "	18,704	12,281	3,684.30
Stoves	No. 25 "	895	11,767	2,945.25	No. 25 "	1,084	16,787	4,199.17
Wire Rope or Strand	Cwts. 25 "	1,671	16,040	3,709.99	Cwts. 25 "	.....	16,984	4,219.45
Do, do, or Rigging for Ships	" Free.	9,105	46,706	.....	Free.	9,927	48,392	.....
Do, Work, all other	" 25 p. c.	.....	29,187	7,297.59	" 25 p. c.	.....	61,217	15,310.27
Hardware, " " N.E.S.	" 20 "	.....	48,534	9,553.15	" 20 "	.....	52,466	10,255.48
Manufactures of Iron, all other, N.E.P.F.	" 20 "	.....	148,807	29,803.69	" 20 "	.....	75,545	15,172.17
Do, do, and Steel, N.E.S.	" 20 "	.....	115,733	23,183.62	" 20 "	.....	122,493	24,509.84
TOTAL .....		.....	1,382,087	300,925.66		.....	1,064,008	428,759.17

MACHINERY, ENGINES.

Agricultural Implements.....	25 p.c.	29,429	7,392.91	%	25 p.c.	25,376	638,804
Cultivators, or parts of, and Ploughs.....	25 "	39,014	9,753.57	%	25 "	37,293	932,294
Mowing and Reaping Machines.....	No.	13,464	3,367.81	No.	25 "	10,978	2,745.33
Threshing Machines.....	No.	49	9,897	No.	25 "	67	14,053
Sewing ".....	2 each & 20 p.c.	9,251	119,681	2 each & 20 p.c.	13,800	193,337	66,206.74
Machinery, not made in Canada, for Worsteds and Cotton Mills.....	Free.	225,313	42,439.33	%	Free to Oct. 1st.	361,108	.....
Machinery, all other, N.E.S., wholly or in part Iron.	25 p.c.	303,898	125,972.09	%	25 p.c.	1,022,518	253,083.86
Fire Extinguishers, Chemical.....	25 "	261	65.25	No.	25 "	1,513	378.25
Do. Engines.....	25 "	4	8,325	No.	25 "	1	2,739
Other " and Boilers.....	25 "	36,109	14,027.42	%	25 "	45,736	11,434.05
Locomotive Engines.....	25 "	33	17,407	No.	25 "	31	151,350
.....	25 "	31	151,350	No.	25 "	31	151,350
TOTAL.....		1,181,758	251,786.63			1,896,241	394,317.38

COAL.

Anthracite.....	516,729	1,509,960	258,307.93	Tons, 50 cts. p. ton	572,092	2,225,437	286,047.04
Bituminous.....	457,049	1,290,761	243,541.02	" 60 "	587,024	1,741,568	352,215.98
All other, and Dust.....	3,565	8,877	1,782.68	" 50 "	387	666	168.08
Coke.....	3,837	19,333	1,918.78	" 50 "	5,492	26,123	2,746.12
Do. Gas, when used in Canadian manufactories.....	1,563	3,941	.....	" Free.	1,251	3,028	.....
TOTAL.....	982,743	2,762,892	505,610.41		1,166,196	4,067,322	641,177.82

EXPORTS.

FISCAL YEAR ENDING JUNE 30TH.

	RATE OF DUTY.	QUANTITY.	VALUE.	RATE OF DUTY.	QUANTITY.	VALUE.
Coal.....	Tons.....	344,694	1,013,899	Tons.....	426,055	1,123,091
Iron Ore.....	".....	39,524	76,474	".....	44,077	114,830
Manganese Ore.....	".....	2,065	27,732	".....	2,101	38,738
Pig Iron.....	".....	2,846	72,023	".....	11	179
Scrap Iron.....	No.....	205,134	205,134	No.....	191,210	.....
Stoves.....	No.....	113	1,532	No.....	240	3,309
Other Castings.....	No.....	20,677	20,677	No.....	14,387	.....
Do. Hardware and Iron.....	No.....	92,588	92,588	No.....	84,713	.....
Machinery.....	No.....	47,193	47,193	No.....	40,201	.....
Sewing Machines.....	No.....	27,663	201,545	No.....	22,463	165,432
Agricultural Implements.....	No.....	39,128	39,128	No.....	31,269	.....
Steel, and Manufactures of.....	No.....	78,451	78,451	No.....	143,656	.....
TOTAL.....		1,896,396	.....		1,951,655	.....

Iron, all other.....	Cwts.	17½ p. c.	2,647	5,436	951.55 Cwts.	17½ p. c.	1,347	3,789	663.11
Boiler Tubes, Lap Welded, not threaded, 1½ in. dia. and over.....	"	"	"	"	"	"	827,269	101,809	15,280.35
Composite Ships' Material.....	"	Free.	"	"	"	"	269	897	"

TOTAL..... 5,377,302 713,809.41 3,821,490 757,611.7

STEEL.

Ingot, Bars, Sheets or Coils.....			328,382	395,837			371,497	1,251,905	
Steel for manufacture of Skates.....			1,002	5,074			154	1,489	

TOTAL..... 329,384 400,911 371,651 1,253,394

RAILS.

Steel Rails for original construction C.P.R.....	Cwts.	Free.	674,388	914,897	Cwts.	Free.	1,102,866	1,790,428	
Do. Fishplates.....	"	"	18,539	22,689	"	"	26,207	42,255	
Do. Rails.....	"	"	1,605,571	2,616,433	"	"	1,354,229	2,225,851	
Iron Rails.....	"	15 p. c.	4,710	8,723	"	15 p. c.	13,561	29,301	3,045.15
Steel Fishplates and Chairs.....	"	Free.	83,475	140,255	"	Free.	43,673	81,770	
Iron.....	"	17½ p. c.	10,943	12,812	"	17½ p. c.	604	2,508	438.90
Frogs, Frog Points and Finger Bars.....	"	"	"	"	"	"	"	"	"
Car Axles, Iron and Steel.....	"	25 "	27,326	74,492	"	25 "	21,354	84,960	21,248.45
Car Wheels.....	"	"	"	"	"	"	"	"	"

TOTAL..... 3,790,281 22,173.69 4,248,073 24,732.50

CASTINGS AND FORGINGS.

Anchors.....	Cwts.	Free.	6,480	23,146	Cwts.	Free.	11,294	37,659	
Chain Cables over ½ diameter.....	"	5 p. c.	31,084	79,163	"	5 p. c.	47,545	108,951	5,447.45
Do. do. All other.....	"	20 "	20,520	73,476	"	20 "	28,885	103,785	20,758.35
Masts, and parts of.....	"	Free.	969	4,818	"	Free.	1,460	4,465	
Crank Shafts for Mills and Steamboats, and Wrought Forgings (rough) over 25 lbs.....	%	20 p. c.	"	18,863	%	20 p. c.	"	37,282	7,456.40
Locomotive Engine Steel Tyres.....	Cwts.	10 "	8,943	45,180	Cwts.	10 "	7,638	37,000	3,700.00
Malleable Iron Castings.....	"	25 "	34,908	8,727.50	"	25 "	"	47,253	11,818.20
Cast " Gas, Water and Soil Pipe.....	"	25 "	"	77,161	"	25 "	"	107,545	26,886.25
Other Castings and Forgings.....	"	25 "	"	299,455	"	25 "	"	397,363	99,488.25

TOTAL..... 656,140 129,834.60 881,303 175,554.90

IMPORTS FOR HOME CONSUMPTION, Etc.—Continued.

IMPORTS.											
FISCAL YEAR ENDING JUNE 30TH.											
CUTLERY, Etc.											
	RATE OF DUTY.		QUANTITY.	VALUE.	DUTY.		RATE OF DUTY.		QUANTITY.	VALUE.	DUTY.
	%	30 p. c.		%	30 p. c.		%	30 p. c.		%	30 p. c.
Axes.....	30 "	30 p. c.		8,600	2,579.85	30 p. c.		30 p. c.		8,985	2,695.43
Edge Tools, N.E.S.....	30 "	30 "		9,119	2,735.20	30 "		30 "		10,557	3,254.55
Sawblades.....	30 "	30 "		29,573	8,871.54	30 N. 35 "		30 N. 35 "		31,333	10,094.15
Hoes.....											
Rakes.....	30 "	30 "		61,844	18,553.08	30 N. 35 "		30 N. 35 "		70,975	24,350.04
Forks.....											
Spades and Shovels.....											
Guns, Rifles and Firearms.....	20 "	20 "		142,152	28,431.03	20 p. c.		20 p. c.		188,326	37,660.90
Files and Rasps.....	30 "	30 "		81,028	24,486.27	35 "		35 "		100,341	33,003.09
Pen and Jack Knives.....	20 "	20 "		21,217	4,243.40	20 "		20 "		26,705	5,340.30
Needles, Knitting and all other.....	20 "	20 "		59,001	11,801.18	20 "		20 "		45,109	9,021.80
Surgical Instruments.....	20 "	20 "		17,155	3,431.00	20 "		20 "		25,258	5,051.00
Saws.....	30 "	30 "		69,722	20,916.53	30 "		30 "		92,673	27,801.10
Carpenters' and other Mechanics' Tools.....	30 "	30 "		309,039	92,719.54	30 "		30 "		352,004	105,636.69
Knife Blades in Blank.....	10 "	10 "		5	80	10 "		10 "		481	48.10
Cutlery, all sorts.....	20 "	20 "		508,738	101,747.90	20 "		20 "		439,435	87,934.92
Needles, Sewing Machine.....						Hds.				15,808	3,179.50
TOTAL.....				1,317,793	320,517.41					1,420,000	353,079.07
HARDWARE, MANUFACTURES.											
Awls.....	30 p. c.	1,224	8,212	2,463.61 Cwts.	30 p. c.	2,986	16,723	5,016.90			
Bedsteads and Iron Furniture, etc.....	25 "	Free.	11,000	2,901.20 %	35 "	353,010	16,318	4,354.74			
Bolts and Nuts, original construction C.P.R.....	Free.	158,080	5,113	 Lbs.	Free.		8,474				
Do. Washers and Rivets.....	30 p. c.		68,403	20,355.97	30 p. c.		86,784	26,034.80			
Builders', Cabinet-makers' and other Hardware.....	30 "		603,000	181,092.80	30 "		671,676	201,573.17			
Hollow Ware, Tinned, Enamelled or Glazed.....	25 "		97,808	24,465.16	25 "		105,100	26,226.40			
Horse Shoes and Horseshoe Nails.....	30 "		4,748	1,424.48	30 "		5,789	1,735.95			
Iron Bridges and Structural Work.....	25 "	49,664	212,537	53,131.94 Cwts.	25 "		162,355	40,590.75			
Do. Do. in original construction C.P.R.....	Free.		11,515	 %	Free.		1,116				

Do.	Do.	in original construction C.P.R.	Free.	11,515	Free.	1,116
Locks, all kinds	36 p.c.	82,376	24,712.35	6	30 p.c.	72,664
Tacks, Brads and Springs	30 p.c.	5,904	2,671.06	4	30 "	3,232
Nails, Hungarian and Cont.	30 p.c.	5,136	1,546.97 Lbs.	30 "	30 "	1,896.40
Do. Iron Wire, "Pointes de Paris"	30 "	124,129	5,929	1,778.70	30 "	1,653.64
Do. Spikes and Sheathing Nails, composition	20 "	31,515	4,970	994.00	20 "	4,537
Do. and Spikes, wrought and pressed, including Railroad spikes	10 p.c.	730,722	8,298.20	10 p.c.	1,358,041	42,236
Nails and Spikes, Cut	10 p.c.	62,994	1,219.92	10 p.c.	98,433	5,954
Spikes, original construction C.P.R.	Free.	3,849	2,639.02	10 p.c.	214,182	12,290
Nuts	10 p.c.	144,080	9,546	5,278.25	25 p.c.	53,337
Safes, and Doors for Safes and Vaults	30 "	49,594	14,877.69	30 "	30 "	16,013.23
Scales, Balances and Weigh Beams	35 "	39,033	13,068.25 Gross.	35 "	216,337	31,975
Screws, Iron, Steel and Wood	30 p.c.	5,006	4,737	1,421.10 Pairs	30 "	12,708
Skates, Iron and Steel	25 "	1,934	24,494	6,228.43 No.	25 "	4,563
Stoves	25 "	16,453	4,113.25 Cwts.	25 "	2,855	49,043
Wire Rope or Strand	Free.	8,009	41,001	Free.	12,846	61,842
Do. Do. or Rigging for Ships	25 p.c.	80,141	20,037.26	25 p.c.	101,785	254,406
Do. Work, all other	20 "	47,114	9,426.45	20 "	32,518	6,533.65
Hardware, " " N.S.S.	20 "	84,892	16,993.35	20 "	81,787	10,464.97
Manufactures of Iron, all other, N.E.P.F.	20 "	134,674	27,050.20	20 "	138,399	28,196.80
Do. Do. and Steel, N.E.S.	20 "			20 "	7,006	2,411.10
Pumps and Pumping Gear, from 20th April, 1883	35 p.c.			35 p.c.		
Total		1,721,100	448,890.77			1,854,335

MACHINERY, ENGINES.

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IMPORTS FOR HOME CONSUMPTION, ETC.—Continued.

FISCAL YEAR ENDING JUNE 30TH.	1882.			1883.		
	QUANTITY.	VALUE.	DUTY.	QUANTITY.	VALUE.	DUTY.
COAL.						
Andracite	Tons, 50c. per ton.	2,000,336	319,148.77	Tons, 50c. per ton.	754,891	334,430.6
Bituminous	" 60c. "	638,273	381,824.92	" 60c. "	911,629	546,980.55
All other, N.E.S.	" 50c. "	636,374	319,824.92	" 50c. "	8,154	4,078
Coke	" 50c. "	471	235.35	" 50c. "	5,345	2,672.42
Do. Gas, when used in Canadian manufactories ..	Free.	8,157	4,078.39	Free.	334	1,619
TOTAL		1,284,417	4,099,352		1,683,951	6,391,369

EXPORTS.

FISCAL YEAR ENDING JUNE 30TH.	1882.			1883.		
	QUANTITY.	VALUE.	DUTY.	QUANTITY.	VALUE.	DUTY.
Coal	Tons.	421,311	1,078,704	Tons.	439,081	1,087,411
Iron Ore	"	43,835	135,403	"	44,944	138,775
Manganese Ore	"	1,425	37,485	"	1,194	29,417
Pig Iron	"	65	1,000	"	14	317
Scrap Iron	"	120,493	1,000	"	14	317
Stoves	No.	53	1,033	No.	64	4,482
Other Castings	"	7,895	1,033	"	798	798
Do. Hardware and Iron	"	299,548	7,895	"	6,699	6,699
Machinery	"	77,432	299,548	"	319,217	319,217
Sewing Machines	"	22,563	77,432	"	74,366	74,366
Agricultural Implements	"	150,663	150,663	"	69,663	69,663
Steel and Manufactures of	"	46,142	46,142	"	16,766	16,766
TOTAL		1,062,106	1,062,106		1,833,993	1,833,993

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IMPORTS FOR HOME CONSUMPTION, Etc.—Continued.

IMPORTS.

1884.

FISCAL YEAR ENDING JUNE 30TH.		RATE OF DUTY.		QUANTITY.	VALUE.	DUTY.
IRON.					\$	\$ c.
Pig, Charcoal	Tons.	\$2 p. ton.		2,893	66,602	5,788.52
Do. All other	"	2 "		49,291	653,708	98,586.22
Scrap and Old	Cwts.	Free.		62,726	44,223	.....
Blooms and Billets. Slabs and Loops	"	10 p. c.		252,310	264,045	26,404.50
Do. and Rod, Rolled or Hammered—R., Sq. & Flat	Cwts.	17½ p. c.		707,071	1,068,048	187,093.65
Nail and Spike Rods	"	17½ "		14,757	21,657	3,788.99
Rolled Beams, Angles, Channels, Tees, Iron, or, and Steel	"	12½ "		82,515	146,615	18,374.72
Boiler Plate	"	12½ "		91,987	221,103	27,680.47
Canada "	Cwts.	12½ p. c.		79,655	175,427	21,961.06
Tinned "	"	Free.		154,044	645,518	.....
Hoop and Band. No. 17 gauge or thinner	Cwts.	12½ p. c.		24,464	49,413	6,191.80
Do. Over No. 17 gauge	"	17½ "		52,674	81,310	14,157.04
Hoop Iron, No. 25 G. or thinner, not over ½ wide, for the manufacture of tubular rivets.	Cwts.	Free.		56	788	.....
Sheet. No. 17 gauge or thinner (smooth or polished coated or galvanized)	"	12½ p. c.		86,821	299,915	37,491.18
Do. Over No. 17 gauge. (common or black)	"	17½ "		55,522	98,018	17,157.10
Tubing, Plain, not threaded, coupled or otherwise manufactured, over 2" dia.	Feet.	15 "		177,282	61,566	9,684.75
Tubing, threaded, coupled, or otherwise manufactured, over 2" dia.	"	20 "		143,755	42,222	8,459.75
Tubing, plain, threaded, coupled or otherwise manufactured, 2" dia. or under	"	25 "		3,422,871	179,976	44,995.25
Tubes, Lap-welded Boiler, not threaded, 1½" dia. and over	Feet.	15 "		688,231	75,434	11,315.10
Wire, Galvanized or Tinned, or not, 15 W. G., or smaller	Cwts.	Free.		11,157	67,890	.....
Wire, Iron or Steel, over 15 G.	Cwts.	15 p. c.		92,505	299,913	44,987.95
Wire, Spring Steel, coppered, for mattresses, No. 9 G. and smaller	Cwts.	Free.		5,987	21,618	.....
Wire Rods in Coils, under 1½" dia., rolled	"	10 p. c.		4,686	11,007	1,100.70
Iron, all other, not otherwise provided for	Cwts.	17½ p. c.		487	1,331	233.05
Composite Ships' Materials—Beams, Sheets, Plates, Angles and Tees, Iron or Steel	Cwts.	Free.		707	2,326	.....
TOTAL					4,605,703	585,451.80
STEEL.						
Ingots, Bars, Sheets and Coils, to 12th March	Cwt.	Free.		1,011	6,559	.....
Ingots and Bars. From 12th March	{ " \$3 p. ton. } { and 10 p. c. }			101,614	393,857	32,698.61
Sheets under ⅝, whole, or cut to shape, from 12th March	{ Cwts. \$3 p. ton. } { and 10 p. c. }			17,969	80,957	5,378.14
Coils, rolled round wire rods, N.E.S.	Cwt.	12½ p. c.		677	1,656	207.46
Steel sheets thicker than ⅝, and N.E.S.	"	Free.		2,455	13,972	.....
Do. Wire Rods, rolled round, under ½ inch, imported by wire manufacturers for use in their factories.	"	5 p. c.		3,842	5,991	299.80
Do. for saws and straw cutters	Cwts.	Free.		4,442	45,181	.....
TOTAL					132,010	547,273 38,584.91

IMPORTS FOR HOME CONSUMPTION, Etc.—Continued.

IMPORTS.

1884.

FISCAL YEAR ENDING JUNE 30TH.	RATE OF DUTY.		QUANTITY.	VALUE.	DUTY.
				\$	\$ c.
RAILS, FISHPLATES, CAR WHEELS AND FROGS.					
Steel Rails for original construction C. P. Railway	Cwts.	Free.	1,334,440	1,705,418	
Do. Fishplates " " " "	"	"	57,972	66,713	
Steel Rails	Cwts.	"	872,368	1,089,517	
Iron " " " "	"	15 p. c.	52,018	50,126	7,518.90
Iron Fishplates and Chairs	Cwts.	Free.	101,892	148,057	
Steel " " to 12th March		"			
Frogs, Frog-points and Finger-bars and Fishplates	"	17½ p. c.	998	1,954	341.97
Car Wheels, " " " "	"	25 "	28,569	111,117	27,859.30
TOTAL				3,173,202	35,720.17

CASTINGS AND FORGINGS.

Anchors	Cwts.	Free.	6,773	25,793	
Chain Cables, over ½ inch diam., shackled or swivelled, or not	"	5 p. c.	29,587	77,435	3,871.75
Chain Cables, all other	"	20 "	17,956	63,943	12,800.25
Masts and parts of	Cwts.	Free.	1,109	6,470	
Locomotive Engine Steel Tyres (Rough)	"	20 p. c.	8,251	39,590	3,959.00
Crank Shafts for Mills and Steamers (rough), over 25 lbs., to 12th March	Cwts.	10 p. c.		30,778	6,155.95
Malleable Iron Castings		25 p. c.		38,365	9,593.05
Cast Iron Gas, Water and Soil Pipes	"	25 "		165,986	41,496.40
Other Castings and Forgings	"	25 "		352,500	88,196.02
TOTAL				800,860	166,072.42

CUTLERY, EDGE TOOLS, &c.

Axes	\$	30 p. c.		9,030	2,716.20
Edge Tools, not elsewhere specified	\$	30 "		7,574	2,273.60
Scythes	No.	35 "	56,558	29,766	10,430.13
Hoes	No.	35 "	15,561	4,984	1,744.40
Rakes	No.	35 "	19,805	6,118	2,143.26
Forks	No.	35 "	35,079	14,666	5,136.90
Spades and Shovels	No.	35 "	94,339	48,852	15,692.87
Guns, Rifles and Firearms	\$	20 "		125,490	25,099.75
Files and Rasps	\$	35 "		90,702	31,745.81
Pen and Jack Knives	\$	20 "		36,628	7,325.60
Needles, knitting and all other, N.E.S.	\$	20 "		37,107	7,441.25
Surgical Instruments	\$	20 "		13,342	2,668.95
Saws	\$	30 "		70,741	21,223.77
Carpenters' and other Mechanics' Tools	\$	30 "		231,596	69,497.50
Forks, Cast Iron, not handled or manufactured	No.	10 "	85,268	539	53.90
Cutlery, all sorts, N.E.S.	\$	20 "		307,501	61,503.46
Sewing Machine Needles	100's.	20 "	18,452	15,265	3,053.00
Machine Needles	\$	30 "		1,084	325.20
TOTAL				1,050,985	270,075.55

IMPORTS FOR HOME CONSUMPTION, ETC.—*Continued.*

IMPORTS.		1884.			
FISCAL YEAR ENDING JUNE 30TH.	RATE OF DUTY.	QUANTITY.	VALUE.	DUTY.	
COAL.			\$	\$	c.
Anthracite	Tons. 50c. p. ton.	868,000	3,831,283	434,000.26	
Bituminous	" 60c. "	1,118,615	3,613,470	671,171.18	
All other, N.E.S.	" 50c. "	258	1,085	128.96	
Coke	" 50c. "	11,207	44,518	5,603.91	
Do. Gas, when used in Canadian manufactories ..	" Free.	332	1,528	.....	
Dust	" 20 p. c.	12,524½	13,515	2,709.25	
TOTAL		2,010,936½	7,505,399	1113,613.56	

NOTE.—In addition to the foregoing Imports there still remained in warehouse on June 30th, 1884:—

Engines, Locomotive	No.	5	23,148	5,787.00	
Do. Fire	No.	10	33,772	8,443.00	
Machinery	\$		210,554	52,638.50	
TOTAL			267,474	66,868.50	

EXPORTS.					
FISCAL YEAR ENDING JUNE 30TH.					
Coal	Tons.	451,631	1,201,172	.....	
Iron Ore	"	25,308	66,549	.....	
Manganese Ore	"	885	15,851	.....	
Pig Iron	"	3	66	.....	
Scrap Iron	\$		26,576	.....	
Stoves	No.	89	1,554	.....	
Other Castings	\$		11,752	.....	
Do. Hardware and Iron	\$		217,389	.....	
Machinery	\$		82,491	.....	
Sewing Machines	No.	8,093	95,326	.....	
Agricultural Implements	\$		17,252	.....	
Steel, and Manufactures of	\$		30,781	.....	
TOTAL			1,766,759	.....	

TOTALS OF IMPORTS.

1868.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.	2,703,000	2,156,419	606,500	30,321.52	2,703,330.52
Steel.....	341,008	341,008			341,008.00
Rails, &c.....	523,648	523,648			523,648.00
Castings and Forgings.....	256,460	256,460			256,460.00
Cutlery and Edge Tools.....	14,024		14,024	2,100.85	16,124.85
Hardware and Manufactures.....	2,457,463		2,457,463	335,561.89	2,814,064.89
Machinery and Engines.....	529,723	271,442	258,281	33,910.30	566,663.30
Total.....	6,885,365	3,549,067	3,336,298	426,024.62	7,311,389.62
Coal.....	1,377,585				1,377,585.00
Grand Total.....	8,262,950	3,549,067	3,336,298	426,024.62	8,688,974.62
Total Exports.....	1,185,704				

1869.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	2,687,105	869,305	1,817,800	90,890.50	2,777,995.50
Steel.....	384,539	384,539			384,539.00
Rails, &c.....	743,516	743,516			743,516.00
Castings and Forgings.....	552,927	552,927			552,927.00
Cutlery and Edge Tools.....	206,669		206,669	31,062.96	237,731.96
Hardware and Manufactures.....	2,619,110		2,619,110	302,708.42	2,921,818.42
Machinery and Engines.....	791,394	311,394	480,253	72,042.63	863,436.63
Total.....	7,385,780	2,861,928	4,523,852	406,733.91	7,882,513.91
Coal.....	1,398,908				1,398,908.00
Grand Total.....	8,784,688	2,861,928	4,523,852	406,733.91	9,281,421.91
Total Exports.....	1,236,199				

1870.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	3,043,884	1,250,008	1,793,876	89,697.16	3,133,581.16
Steel.....	361,139	361,139			361,139.00
Rails, &c.....	917,283	917,283			917,283.00
Castings and Forgings.....	381,669	381,669			381,669.00
Cutlery and Edge Tools.....	297,008		297,008	44,555.15	341,563.15
Hardware and Manufactures.....	2,193,342		2,193,342	329,003.37	2,522,345.37
Machinery and Engines.....	557,065	193,245	363,850	54,577.77	611,622.77
Total.....	7,750,867	3,102,711	4,648,156	517,833.95	8,268,700.95
Coal.....	1,985,245			57,136.07	1,960,215.02
Grand Total.....	9,136,112	3,102,711	4,648,156	574,970.02	10,228,915.97
Total Exports.....	1,223,734				

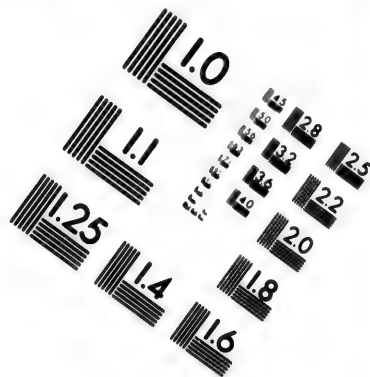
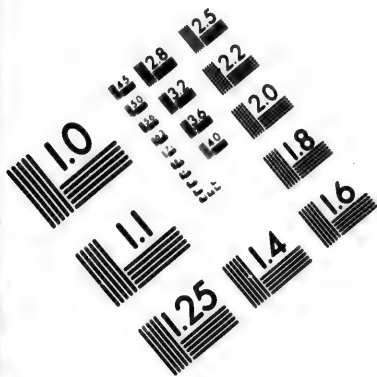
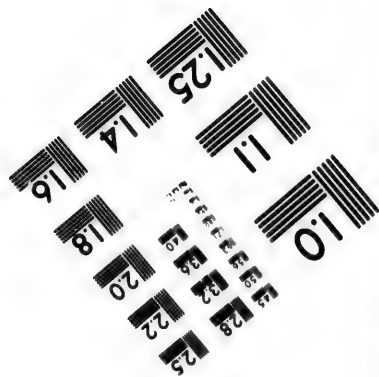
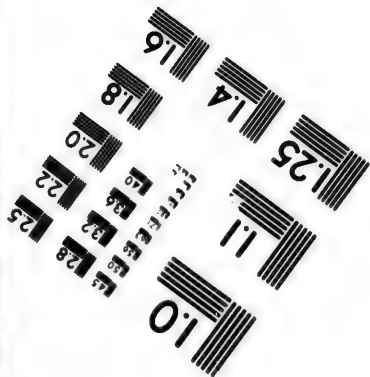
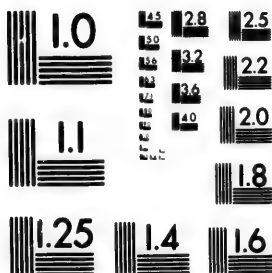


IMAGE EVALUATION TEST TARGET (MT-3)



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TOTALS OF IMPORTS.—Continued.

1871.

IMPORTS.	INVOICE VALUE.	FREE.	DEBTABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	4,211,543	1,762,144	2,449,399	122,468.56	4,333,861.56
Steel.....	506,895	506,895	.....	.....	506,895.00
Rails, &c.....	1,325,021	1,325,021	.....	.....	1,325,021.00
Castings and Forgings.....	407,355	407,355	.....	.....	407,355.00
Cutlery and Edge Tools.....	349,392	.....	349,392	52,402.11	401,794.11
Hardware and Manufactures.....	2,934,408	.....	2,934,408	449,118.70	3,383,526.70
Machinery and Engines.....	1,053,791	17,067	1,036,724	158,965.55	1,204,750.55
Total.....	10,808,645	4,019,082	6,789,563	773,494.92	11,582,139.92
Coal.....	1,252,400	.....	.....	122,192.82	1,474,592.82
Grand Total.....	12,160,745	4,019,082	6,789,573	895,627.74	13,056,372.74
Total Exports.....	1,496,370	.....	.....	.....	.....

1872.

IMPORTS.	INVOICE VALUE.	FREE.	DEBTABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	6,494,043	3,246,871	3,247,172	162,358.28	6,656,401.28
Steel.....	624,926	624,926	.....	.....	624,926.00
Rails, &c.....	3,005,529	3,005,529	.....	.....	3,005,529.00
Castings and Forgings.....	409,535	409,535	.....	.....	409,535.00
Cutlery and Edge Tools.....	456,875	.....	456,875	68,532.46	525,407.46
Hardware and Manufactures.....	3,991,577	.....	3,991,577	540,240.99	4,531,817.99
Machinery and Engines.....	1,520,694	261,430	1,259,264	188,888.43	1,479,892.43
Total.....	15,913,179	7,548,311	8,364,868	930,020.16	16,843,199.16
Coal.....	2,055,247	.....	.....	.....	12,055,247.00
Grand Total.....	17,928,426	7,548,311	8,364,868	930,020.16	18,858,446.16
Total Exports.....	1,747,651	.....	.....	.....	.....

1873.

IMPORTS.	INVOICE VALUE.	FREE.	DEBTABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	9,211,182	4,372,031	4,839,148	242,107.47	9,456,289.47
Steel.....	754,319	754,319	.....	.....	754,319.00
Rails, &c.....	6,891,861	6,891,861	.....	.....	6,891,861.00
Castings and Forgings.....	725,512	725,512	.....	.....	725,512.00
Cutlery and Edge Tools.....	476,393	.....	476,393	71,461.02	547,854.02
Hardware and Manufactures.....	4,389,051	.....	4,389,051	639,766.22	5,028,817.22
Machinery and Engines.....	2,674,702	422,310	2,252,392	382,857.70	3,357,559.70
Total.....	25,435,020	13,166,036	12,268,984	1,356,132.41	26,791,152.41
Coal.....	2,558,723	.....	.....	.....	2,558,723.00
Grand Total.....	27,993,743	13,166,036	12,268,984	1,356,132.41	29,349,875.41
Total Exports.....	2,573,729	.....	.....	.....	.....

TOTALS OF IMPORTS.—Continued.

1874.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.	5,367,829	1,925,398	3,442,431	175,171.00	5,543,000.00
Steel.....	679,863	679,863	.....	.....	679,863.00
Rails, &c.....	4,326,695	4,326,695	.....	.....	4,326,695.00
Castings and Forgings.....	1,580,776	1,537,101	43,675	3,088.79	1,583,864.79
Cutlery and Edge Tools.....	853,412	.....	853,412	131,562.01	984,974.01
Hardware and Manufactures.....	4,799,190	.....	4,799,190	741,357.23	5,540,547.23
Machinery and Engines.....	3,092,622	339,399	2,753,223	415,178.17	3,565,800.17
Total.....	20,700,387	8,808,366	11,892,021	1,464,457.26	22,164,844.20
Coal.....	3,805,353	.....	.....	.....	3,805,353.00
Grand Total.....	24,505,740	8,808,366	11,892,021	1,464,457.26	25,970,197.20
Total Exports.....	2,367,866	.....	.....	.....	.....

1875.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	5,473,803	1,524,352	3,949,451	197,472.85	5,671,275.85
Steel.....	575,032	575,032	.....	.....	575,032.00
Rails, &c.....	5,287,861	5,287,861	.....	.....	5,287,861.00
Castings and Forgings.....	524,852	457,398	67,454	5,281.49	530,133.49
Cutlery and Edge Tools.....	604,267	.....	604,267	105,748.76	710,015.76
Hardware and Manufactures.....	5,101,394	111,350	4,990,044	863,799.78	5,953,793.78
Machinery and Engines.....	1,431,389	174,497	1,256,892	206,476.88	1,657,865.88
Total.....	18,999,198	8,160,490	10,838,708	1,378,779.76	20,377,977.76
Coal.....	3,076,088	.....	.....	.....	3,076,088.00
Grand Total.....	22,075,286	8,160,490	10,838,708	1,378,779.76	23,454,065.76
Total Exports.....	1,754,661	.....	.....	.....	.....

1876.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	3,597,929	807,339	2,790,590	133,539.00	3,641,468.00
Steel.....	384,105	384,105	.....	.....	384,105.00
Rails, &c.....	3,897,770	3,897,770	.....	.....	3,897,770.00
Castings and Forgings.....	397,569	268,223	129,346	2,580.15	310,149.15
Cutlery and Edge Tools.....	445,798	.....	445,798	78,622.56	523,820.56
Hardware and Manufactures.....	3,535,946	104,012	3,431,934	508,329.87	4,134,275.87
Machinery and Engines.....	886,000	1,856	884,144	134,817.95	1,020,817.95
Total.....	12,065,117	5,463,305	7,501,812	947,400.43	13,912,407.43
Coal.....	3,320,000	.....	.....	.....	3,320,000.00
Grand Total.....	16,285,177	5,463,305	7,501,812	947,400.43	17,332,467.43
Total Exports.....	1,670,513	.....	.....	.....	.....

TOTALS OF IMPORTS.—Continued.

1877.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	3,781,818	861,225	2,917,223	152,291 06	3,934,109 06
Steel.....	431,474	431,474	.....	.....	431,474 00
Rails, &c.....	1,966,116	1,966,116	.....	.....	1,966,116 00
Castings and Forgings.....	922,833	266,251	656,582	7,288 66	310,421 66
Cutlery and Edge Tools.....	324,090	.....	91,722 18	.....	615,812 18
Hardware and Manufactures.....	3,128,839	89,320	3,039,509	330,155 40	3,659,014 40
Machinery and Engines.....	947,451	661	946,487	154,318 87	1,101,469 87
Total	11,082,321	3,561,430	7,520,891	936,096.17	12,018,417.17
Coal.....	3,660,928	.....	.....	.....	3,660,928 00
Grand Total.....	14,743,249	3,561,430	7,520,891	936,096.17	15,679,345.17
Total Exports	1,430,626	.....	.....	.....	.....

1878.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	2,967,650	488,824	2,448,826	151,547 25	3,089,197 25
Steel.....	333,073	333,073	.....	.....	333,073 00
Rails, &c.....	1,403,821	1,403,821	.....	.....	1,403,821 00
Castings and Forgings.....	546,811	165,588	381,223	62,288 32	609,099 32
Cutlery and Edge Tools.....	340,512	.....	560,512	98,097 52	658,609 52
Hardware and Manufactures.....	2,777,568	78,336	2,699,432	470,204 64	3,247,972 64
Machinery and Engines.....	778,671	1,901	776,770	121,354 03	903,925 03
Total.....	9,398,306	4,531,543	6,866,763	906,491.76	10,304,797.76
Coal.....	3,062,150	.....	.....	.....	3,062,150 00
Grand Total.....	12,460,456	4,531,543	6,866,763	906,491.76	13,366,947.76
Total Exports.....	1,872,747	.....	.....	.....	.....

1879.

IMPORTS.	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE. Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	2,478,674	231,811	2,246,863	190,895 24	2,669,569 24
Steel.....	347,992	347,992	.....	.....	347,992 00
Rails, &c.....	1,049,881	1,049,881	.....	.....	1,049,881 00
Castings and Forgings.....	415,695	95,636	320,059	58,556 89	474,251 89
Cutlery and Edge Tools.....	511,875	.....	511,875	98,236 39	610,141 39
Hardware and Manufactures.....	2,206,486	50,164	2,156,322	403,167 32	2,610,443 32
Machinery and Engines.....	951,692	20,028	931,664	178,682 73	1,130,374 73
Total.....	7,962,295	1,795,512	6,166,783	930,358 57	8,893,653.57
Coal.....	2,985,241	.....	.....	109,404 60	3,094,645 60
Grand Total.....	10,947,536	1,795,512	6,166,783	1,039,763.26	11,987,399.86
Total Exports.....	1,482,999	.....	.....	.....	.....

TOTALS OF IMPORTS.—*Continued.*

1880.

IMPORTS	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$	\$	\$	\$ c.	\$ c.
Iron, &c.....	3,384,876	.....	3,384,876	471,851 50	3,856,727 50
Steel.....	654,874	654,874	.....	.....	654,874 00
Rails, &c.....	2,315,231	2,247,983	67,248	22,690 42	2,367,921 42
Castings and Forgings.....	444,375	27,791	417,184	79,569 67	496,753 67
Cutlery and Edge Tools.....	734,859	.....	734,859	180,927 91	915,786 91
Hardware and Manufactures.....	1,382,087	67,706	1,315,381	390,925 66	1,743,012 66
Machinery and Engines.....	1,481,758	225,313	956,445	251,786 63	1,433,744 63
Total.....	10,128,660	3,202,667	6,925,993	1,367,691 79	11,496,351 79
Coal.....	2,762,892	.....	.....	505,619 11	3,268,512 41
Grand Total.....	12,891,552	3,202,667	6,925,993	1,873,310 90	14,764,854 30
Total Exports.....	1,896,396	.....	.....	.....	.....

1881.

IMPORTS	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$ c.	\$	\$	\$ c.	\$ c.
Iron, &c.....	4,028,343	.....	4,028,343	592,288 15	4,590,631 15
Steel.....	797,087	797,087	.....	.....	797,087 00
Rails, &c.....	3,172,829	3,123,602	49,227	10,884 29	3,183,713 29
Castings and Forgings.....	598,478	26,816	481,662	96,000 00	604,478 00
Cutlery and Edge Tools.....	917,669	.....	917,669	224,842 50	1,142,511 50
Hardware and Manufactures.....	1,664,608	48,392	1,616,216	428,759 17	2,093,397 17
Machinery and Engines.....	1,896,211	361,408	1,505,133	394,317 38	2,260,558 38
Total.....	12,955,855	4,357,605	8,598,250	1,717,091 49	11,672,946 49
Coal.....	4,097,322	.....	.....	641,177 82	4,738,499 82
Grand Total.....	17,053,177	4,357,605	8,598,250	2,358,269 31	19,411,446 31
Total Exports.....	1,951,655	.....	.....	.....	.....

1882.

IMPORTS	INVOICE VALUE.	FREE.	DUTIABLE.	DUTY.	TOTAL VALUE, Including Duty.
	\$ c.	\$	\$	\$ c.	\$ c.
Iron, &c.....	5,377,302	512,887	4,864,415	713,809 41	6,091,111 41
Steel.....	900,931	900,931	.....	.....	900,931 00
Rails, &c.....	3,790,281	3,694,254	96,027	22,173 69	3,816,427 69
Castings and Forgings.....	656,110	27,964	628,146	129,834 60	757,980 60
Cutlery and Edge Tools.....	1,217,793	.....	1,217,793	320,517 41	1,638,310 41
Hardware and Manufactures.....	1,721,100	61,478	1,659,622	448,890 77	2,108,512 77
Machinery and Engines.....	3,735,941	.....	3,735,941	958,768 16	4,694,709 16
Total.....	17,499,488	5,197,514	12,301,974	2,593,991 04	20,003,483 04
Coal.....	4,099,352	.....	.....	705,288 03	5,404,640 03
Grand Total.....	22,198,840	5,197,514	12,301,974	3,299,279 07	25,408,143 07
Total Exports.....	1,962,106	.....	.....	.....	.....

TOTALS OF IMPORTS.—*Continued.*

1883.

IMPORTS.	INVOICE VALUE.	FREE.	DUTYABLE.	DUTY.	TOTAL VALUE, Including Duty.
Iron, &c.	\$ 5,821,430	\$ 5,821,430	\$ 4,903,106	\$ 757,761 17	\$ 6,579,251 17
Steel, &c.	1,253,394	1,253,394	—	—	1,253,394 00
Rails, &c.	1,218,075	1,110,391	107,599	21,732 50	1,239,722 50
Castings and Forgings	81,393	—	829,179	155,354 00	1,644,527 00
Cutlery and Edge Tools	1,420,040	—	—	—	1,420,040 00
Hardware and Manufactures	1,850,558	71,432	1,789,996	187,818 01	2,049,244 01
Machinery and Engines	4,900,996	—	4,900,996	1,182,777 77	6,083,773 77
Total.....	20,080,274	6,365,638	13,714,636	2,083,703 12	23,063,977 13
Coal	6,231,299	—	—	990,996 04	7,222,295 04
Grand Total	26,311,573	6,365,638	13,714,636	3,074,699 16	30,386,313 06
Total Exports.....	1,833,993	—	—	—	—

1884.

IMPORTS.	INVOICE VALUE.	FREE.	DUTYABLE.	DUTY.	TOTAL VALUE, Including Duty.
Iron, &c.	\$ 4,605,703	\$ 680,711	\$ 3,915,962	\$ 585,431 80	\$ 5,191,154 80
Steel, &c.	347,273	61,812	182,461	28,584 01	388,857 01
Rails, &c.	3,173,292	3,000,706	163,497	33,730 17	3,268,932 17
Castings and Forgings	800,860	25,596	773,067	166,052 42	1,064,712 42
Cutlery and Edge Tools	1,439,983	—	1,439,983	270,055 55	1,710,038 55
Hardware and Manufactures	2,150,670	395,601	1,755,066	171,738 06	2,326,404 06
Machinery and Engines	2,462,031	180,176	2,281,858	600,292 83	2,882,150 83
Total.....	14,790,727	4,365,831	10,424,896	2,170,934 81	16,961,661 84
Coal	7,505,289	—	—	1,113,613 56	8,619,902 56
Grand Total	22,296,016	4,365,831	10,424,896	3,284,548 37	25,580,674 10
Total Exports.....	1,766,759	—	—	—	—

WEIGHTS OF SOME OF THE IMPORTATIONS.

All Weights are in Net Tons of 2,000 lbs.

Year ending June 30.

ARTICLES.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Charcoal Pig.....								6,887	2,198	2,893
All other Pig.....	9,595	31,192	35,516	30,090	15,503	23,150	43,030	56,594	75,295	49,291
Scrap and Old.....	290	310	325	420	528	928	584	1,327	1,102	3,136
Bars Puddled, Blooms and Billets.....	7,235	3,559	5,190	1,365	275	9,778	5,583	10,194	12,931	12,615
Bars and Rods, rd. sq. and flat, in- cluding Hoop and Sheet to 1877.....	41,070	29,068	37,985	39,331	28,175	26,775	30,064	44,574	45,049	35,333
Nail and Spike Rod.....	1,373	1,143	1,810	1,379	667	610	581	833	921	737
Rolls Beam, Channel, Tees, &c.....						680	1,280	2,096	3,039	1,125
Boiler Plate.....	1,111	750	3,405	1,654	2,271	2,906	3,317	4,552	4,588	4,599
Canada Plate.....			5,134	2,791	2,015	2,476	3,297	3,939	3,452	3,982
Tinned Plate.....	6,786	6,704	1,189	4,250	1,667	4,897	8,785	9,772	8,547	7,702
Galvanized.....	957	750	2,117	1,038	788					
Hoop & Band, No. 17 G. & under.....						1,613	1,296	1,425	1,516	1,223
Hoop and Band, over 17 G.....						1,028	1,356	2,267	1,975	2,633
				5,197	1,464					
Sheet, No. 17 G. and under.....						3,075	3,211	3,736	4,999	4,341
" over 17 G.....						1,970	1,887	2,261	3,034	2,776
Wire Rods, in coils, under 1 in. dia.....							292	443	783	234
Wire.....	2,542	1,371	1,875	1,553		3,124	4,644	6,006	5,632	4,625
" under No. 15 G.....									220	557
Other Iron.....										
Tubing, Plain, over 2 in. dia.....						3,282			2,146	1,789
" Threaded, over 2 in. dia.....									842	539
" 2 in. dia. and under.....	2,436	2,094	2,236	4,030	3,000	1,597	5,000	6,000	3,344	2,567
" Boiler, 1½ in. dia. & over.....									827	688
Steel.....	4,262	3,339	3,642	4,512	3,999	8,991	10,495	16,469	18,592	6,600
Iron Rails, including fish-plates, frogs, car wheels, and axles, for 1875, 1876.....			16,796	10,134	6,840	142	237	235	678	2,600
	81,574	78,088								
Steel Rails.....			32,932	27,204	23,748	76,980	89,649	113,997	122,854	110,320
Fish-plates, iron and steel, and frogs, 1879-1884.....			2,318	1,365	1,322	2,210	3,794	5,647	3,674	8,042
TOTALS.....	199,546	159,950	152,470	127,316	98,295	176,251	218,992	298,364	328,838	273,967
Domestic Production of Pig Iron, returns for 1884 official, other years estimated.....	4,000	4,000	13,500	16,000	16,500	23,000	18,500	21,500	32,000	29,380

NOTE.—The weights of Tubing are not given for 1881, 2, 3, 4, but are estimated. The last two years, from the number of lineal feet imported. Tubing over 2 inches in diameter, is estimated at 7½ lbs. per foot, under 2 inches at 1½ lbs. per foot, and Boiler Tubes, 1½ inches in diameter and over, at 2½ lbs. per foot.

It is impossible to estimate the quantities of both cast and wrought scrap iron re-worked annually, but the amounts are very considerable.

* Estimated.

INVOICE VALUE (NOT INCLUDING FREIGHTS OR DUTIES) OF IMPORTS OF IRON AND STEEL, AND MANUFACTURES THEREOF, AND COAL, FOR HOME CONSUMPTION, IN THE DOMINION OF CANADA, DURING THE FISCAL

YEARS, 1868 TO 1884, AND EXPORTS OF THE SAME, THE PRODUCE AND MANUFACTURES OF THE DOMINION.

Prepared from Dominion Trade and Navigation Returns.

Year.	Iron, &c.	Steel.	Rails, &c.	Castings, and Forgings.	Cutlery, Edge Tools, &c.	Hardware, and Manufactures.	Machinery, and Engines.	Total.	Coal.	Grand Total.	Exports, including Coal.
1868	\$ 2,763,009	\$ 341,006	\$ 525,648	\$ 256,490	\$ 11,024	\$ 2,437,463	\$ 527,228	\$ 6,885,365	\$ 1,577,585	\$ 8,462,950	\$ 1,857,570
1869	2,987,105	384,632	743,516	532,927	26,660	2,919,119	791,911	7,285,780	1,398,908	8,684,688	1,290,399
1870	3,043,884	381,139	917,283	581,036	25,088	2,193,312	577,665	7,750,867	1,387,245	9,138,112	1,223,734
1871	4,211,513	506,895	1,325,621	467,385	340,392	2,694,168	1,673,731	10,808,945	1,352,100	12,161,045	1,490,376
1872	6,491,013	624,926	3,065,529	466,575	456,775	3,661,577	1,621,094	13,913,170	2,017,247	15,930,418	1,747,651
1873	9,214,182	754,319	6,891,891	725,512	476,395	4,398,651	2,574,792	25,435,029	2,508,723	27,943,752	2,577,726
1874	5,367,829	679,863	4,326,065	1,590,776	833,412	4,799,190	3,662,922	29,700,387	3,856,633	33,557,020	2,367,866
1875	5,473,863	575,032	5,287,861	524,852	604,297	5,101,394	1,431,389	18,169,118	3,676,988	21,846,106	1,774,964
1876	3,597,929	384,105	3,897,570	357,599	445,798	3,535,916	889,000	12,962,117	3,320,000	16,282,117	1,670,511
1877	3,581,878	431,474	1,966,116	392,833	524,699	3,128,829	947,151	11,092,321	3,600,928	14,743,249	1,430,025
1878	2,937,579	393,679	1,406,821	346,811	566,512	2,577,768	778,671	9,388,396	3,662,150	13,050,546	1,872,517
1879	2,478,074	347,692	1,049,681	415,065	511,877	2,266,186	951,692	7,482,265	2,985,241	10,467,506	1,482,000
1880	3,384,876	654,874	2,345,231	444,975	731,870	1,592,087	1,181,758	10,128,660	2,792,892	12,921,552	1,806,386
1881	4,028,343	767,087	3,172,829	598,478	917,099	1,694,698	1,866,241	12,975,855	4,097,322	17,073,177	1,961,735
1882	5,377,392	990,331	3,790,281	656,140	1,317,765	1,721,100	3,275,911	17,400,488	4,699,372	22,100,860	1,982,106
1883	5,821,490	1,253,394	4,248,673	881,293	1,429,660	1,854,358	4,000,966	20,000,274	6,391,266	26,391,540	1,833,499
1884	4,065,796	547,273	3,173,202	800,800	1,669,987	2,150,070	2,462,931	11,790,727	7,566,399	19,357,126	1,766,779

TOTAL VALUE, INCLUDING DUTY, (BUT NOT INCLUDING FREIGHTS) OF IMPORTS FOR HOME
CONSUMPTION, OF IRON AND STEEL, &c.

Year.	Iron, &c.		Steel.		Rails, &c.		Castings and Foundries.		Cutlery, Edge Tools, &c.		Hardware Manufactures.		Machinery Engines.		Total.		Coal.		Grand Total.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
1868	2,736,330	52	341,098	00	525,648	00	256,400	00	16,124	87	284,804	80	506,003	70	7,311,380	92	1,577,587	00	8,888,974	92
1869	2,777,995	50	384,339	00	743,516	00	552,927	00	237,571	96	2,251,908	42	803,956	03	7,582,513	91	1,398,968	00	8,981,481	91
1870	3,113,581	16	301,135	00	917,280	00	261,036	00	341,643	65	2,522,347	37	611,672	77	8,298,700	95	1,990,215	92	10,288,915	97
1871	4,333,381	56	500,895	00	1,325,021	00	407,855	00	491,794	11	3,374,230	55	1,232,296	55	11,582,139	92	1,474,232	82	13,056,372	74
1872	6,650,401	28	624,025	00	3,065,529	00	409,335	00	525,407	46	4,111,817	99	1,479,582	43	16,843,199	16	2,017,247	00	18,860,446	16
1873	9,450,280	47	754,319	00	6,891,861	00	725,512	00	517,834	02	5,657,537	22	3,337,559	70	26,701,152	41	2,538,723	00	29,239,875	41
1874	5,543,000	00	679,863	00	4,329,665	00	1,383,864	79	984,974	01	5,740,047	23	3,505,800	17	22,164,844	20	3,805,551	00	25,970,395	20
1875	5,671,275	85	575,032	00	5,297,801	00	539,133	49	710,015	76	5,865,733	78	1,637,805	88	20,377,577	76	3,057,088	00	23,434,665	76
1876	3,691,408	90	384,165	00	3,867,770	00	310,140	15	525,829	56	4,134,253	87	1,029,817	95	13,912,407	43	3,329,900	00	17,242,307	43
1877	3,034,119	06	431,474	00	1,906,116	00	310,421	06	615,812	18	3,659,014	40	1,101,499	87	12,918,417	17	3,000,028	00	15,918,445	17
1878	3,689,197	25	303,073	00	1,463,821	00	600,000	32	678,999	32	3,217,973	64	993,025	03	10,201,797	76	3,062,170	00	13,263,967	76
1879	2,660,569	24	317,062	00	1,049,881	00	474,531	80	610,141	39	2,610,443	32	1,130,374	73	8,802,651	37	3,094,045	00	11,896,696	37
1880	3,856,727	50	654,874	00	2,367,921	42	524,484	07	945,786	91	1,743,012	05	1,432,544	03	11,496,351	79	3,298,562	41	14,794,913	20
1881	4,600,631	15	797,087	00	3,183,713	29	604,478	00	1,142,511	50	2,069,937	17	2,299,558	38	14,672,946	49	4,758,499	82	19,431,446	31
1882	6,691,111	41	990,331	00	5,812,474	69	783,571	00	1,638,310	41	2,169,000	77	4,904,709	16	20,069,182	04	5,404,640	03	25,473,822	07
1883	6,579,25		1,233,394	00	4,272,805	50	1,036,871	00	1,775,739	07	2,342,170	01	3,781,753	77	23,663,977	42	7,222,335	64	30,886,313	06
1884	5,191,154	29	585,857	01	3,296,922	17	966,032	42	1,324,000	55	2,625,408	06	3,062,726	83	16,901,661	84	8,019,012	56	24,920,674	40

DETAILS OF IMPORTATIONS OF PIG IRON.

To	Great Britain.			United States.			Germany.			Newfound-land.			Total.		
	Tons.	Value.	Av'ge	Tons.	Value.	Av'ge	Tons.	Value.	Av'ge	Tons.	Value.	Av'ge	Tons.	Value.	Av'ge
1875															
Ontario.	81	6,038		1787	1,023,411								18151	5,001,03	
Quebec.	2360	196,60		1772	14,900		247	6806		50	25179		25179	10,460	
Nova Scotia.	1665	180.8		147	4018					2	25		1800	5251	
New Brunswick.	206	1,553		2144	7117								610	11,678	
Manitoba.	95	2243											97	2408	
British Columbia.	48	2223											48	2223	
Prince Edward Island.															
	25112	600355	21.90	21935	622,003	28.38	247	6806		3	75		49505	1,220,980	24.80
1876															
Ontario.	291	21,287		7008	1,4502								8018	185,080	
Quebec.	19830	1,8022					110	2165					19900	32,108	
Nova Scotia.	835	1,462		203	5,500		16	330		4	160		1005	2,5782	
New Brunswick.	1572	22,009		54	10,270								1905	3,2018	
Manitoba.	65	1502												6	
British Columbia.	125	2818											88	2018	
Prince Edward Island.													123	2818	
	23241	581736	16.05	7818	183,257	23.41	126	2475		4	160		31192	57,048	18.20
1877															
Ontario.	2872	51175		5291	11,808								8103	160,073	
Quebec.	23000	1,5538		8	174								23600	45,127	
Nova Scotia.	505	1,220		315	8,773								1020	2,212	
New Brunswick.	2122	35,452		615	12,818								3637	18,570	
Manitoba.	65	1502		26	1,660								26	660	
British Columbia.	80	1528											80	1528	
Prince Edward Island.	121	2165											121	2165	
	22261	51,6612	18.13	6255	137,323	21.95							35516	67,935	19.00
1878															
Ontario.	3186	55,657		3613	8,022								7119	140,270	
Quebec.	19500	25,388		185	3,498								19500	25,388	
Nova Scotia.	525	8240		185	3,498		2	94					710	11,712	
New Brunswick.	2355	3,002											2355	3,002	
Manitoba.	65	1502		32	849								33	849	
British Columbia.	66	1658		65	1,002								131	3056	
Prince Edward Island.	125	1584											123	1584	
	26174	37,829	15.19	3944	90,001	23.22	2	94					30090	188,821	16.24
1879															
Ontario.	1237	17,855		1839	6,178								2067	64,023	
Quebec.	12059	161,001		2	36								12061	161,127	
Nova Scotia.	76	1645		228	3,064								394	5,200	
New Brunswick.					38									38	
Manitoba.				21	524								21	524	
British Columbia.	40	595		88	285								48	880	
Prince Edward Island.															
	13412	181,186	13.50	2089	50,025	24.23							15501	2,1841	14.95
1880															
Ontario.	2050	57,229		2814	93,497								6773	150,227	
Quebec.	14801	190,619		1	10								14802	190,635	
Nova Scotia.	585	10,118		50	1,797								744	11,945	
New Brunswick.	253	3050		224	16,080								477	13,048	
Manitoba.				32	1,380								32	1,380	
British Columbia.	196	2370		39	1,178								235	3548	
Prince Edward Island.	6	73											6	73	
	19090	263,490	13.18	3100	108,466	34.22							23159	371,936	16.06
1881															
Ontario.	8587	12,7973		8058	191,133								19645	319,106	
Quebec.	22972	31,514		78	2,117								23150	31,331	
Nova Scotia.	665	9985		582	17,218								1219	27,293	
New Brunswick.	456	5181		1860	15,019		28	317					2344	51,447	
Manitoba.	56	1015		78	2,090								134	3,105	
British Columbia.	45	660		2	70								47	730	
Prince Edward Island.	61	775											61	775	
	32944	457,103	13.87	10658	258,577	24.25	28	317					43630	715,997	16.41

DETAILS OF IMPORTATIONS OF PUDDLED BARS.—BLOOMS AND BILLETS.

To	Great Britain.			United States.			Sweden.			Total.		
	Cwts.	Value.	Avg.	Cwts.	Value.	Avg.	Cwts.	Value.	Avg.	Cwts.	Value.	Avg.
1875.	14450	216857	1.50	160	240	1.50				14610	217097	1.50
1876.	6728	110805	1.78	3811	12967	3.42	70	150		10609	132822	1.86
1877.												
Ontario.....												
Quebec.....	3885	43878		161	626					4046	44504	
Nova Scotia.....	5659	91740		925	17430					6584	109170	
New Brunswick.....				240	431					240	431	
	9552	136018	1.48	9624	18498	1.92				19176	155216	1.52
1878.												
Ontario.....	641	1165		123	380					764	1545	
Quebec.....	16422	36373		28	129					16450	36502	
Nova Scotia.....	45	112		45	125					90	237	
	17108	37650	1.02	198	634	3.20				17306	38284	1.02
1879.												
Ontario.....				11	11					11	11	
Quebec.....	1720	4382		257	556					1937	4938	
Nova Scotia.....	240	544		201	520					440	1064	
	1916	4936	.90	458	1087	2.40				2374	6013	1.08
1880.												
Ontario.....	221	553								221	553	
Quebec.....	195220	243522		23	304		102	308		195343	243826	
Nova Scotia.....	6	14								6	14	
	195447	243800	1.24	23	304	1.71	102	308		195572	244112	1.26
1881.												
Ontario.....				14	24					14	24	
Quebec.....	11652	111350								11652	111350	
	11652	111350	.90	14	24	1.71				11666	111374	.90
1882.												
Ontario.....				6	48					6	48	
Quebec.....	203882	222010								203882	222010	
	203882	222010	1.08	6	48	8.00				203888	222058	1.08
1883.												
Ontario.....				2123	5007					2123	5007	
Quebec.....	256510	264801								256510	264801	
Nova Scotia.....				6	10					6	10	
	256510	264801	1.05	2129	5017	2.35				258639	269818	1.04
1884.												
Ontario.....				809	1419					809	1419	
Quebec.....	248956	28425		10	14					248966	28440	
Nova Scotia.....				1136	227					1136	227	
New Brunswick.....	1339	1259								1339	1259	
	250295	259685	1.03	2015	4360	2.16				252310	264045	1.04

DETAILS OF IMPORTATIONS OF BARS AND RODS.

To	Great Britain			United States			Germany, Belgium				Totals			
	Cwts.	Value.	Average.	Cwts.	Value.	Average.	Cwts.	Value.	Cwts.	Value.	Cwts.	Value.	Average.	
1877.														
Ontario.....	12,666	21,577		68,770	17,797						19,133	37,092		
Quebec.....	23,523	58,957		8,477	10,007						32,570	99,660		
Nova Scotia.....	15,573	38,151		500	546						14,273	38,195		
New Brunswick.....	65,531	117,807		9,151	17,961						74,982	137,993		
Manitoba.....	10	19		148	261						158	389		
British Columbia.....	4486	11,427		39	214						485	1,399		
P. E. Island.....	39,380	3,129		969	500						37,092	13,921		
	60,912	99,490	1.77	87,667	20,090	2.28					69,949	119,789	1.81	
1878.														
Ontario.....	12,134	26,8		12,868	17,111						19,122	42,666		
Quebec.....	23,523	130,111		267	807						23,523	130,111		
Nova Scotia.....	16,912	6,185		1,891	2,041						18,803	8,226		
New Brunswick.....	18,019	79,880		1,291	1,140						19,310	81,020		
Manitoba.....	31	591		192	268						223	642		
British Columbia.....	2,432	2,918		94	476						2,526	3,394		
P. E. Island.....	14,975	2,988		342	950						15,317	3,938		
	50,917	87,667	1.71	16,668	4,350	1.28					67,585	92,018	1.66	
1879.														
Ontario.....	15,093	22,300		15,093	8,567						18,306	30,867		
Quebec.....	28,257	12,574		283	856		179	101	100	124	28,701	13,698		
Nova Scotia.....	16,257	2,903		12,865	18,783					975	103	20,377	15,721	
New Brunswick.....	11,231	6,144		3,893	9,883						15,093	16,027		
Manitoba.....	72	225		1,322	3,497						1,394	3,722		
British Columbia.....	406	10,258		430	1,967						834	12,225		
P. E. Island.....	6,621	1,681		1,049	2,009		135	213			7,805	11,903		
	60,919	75,632	1.25	67,690	13,582	1.91	128	647	105	115	93,511	89,559	1.58	
1880.														
Ontario.....	11,573	18,943		7,825	2,808						11,808	26,451		
Quebec.....	30,439	61,760		2,811	9,935		2120	3,894	218	520	33,882	51,442		
Nova Scotia.....	17,79	68,608		1,892	9,996			7	21		16,151	78,504		
New Brunswick.....	16,006	74,882		1,541	3,891				802	2,170	17,645	78,983		
Manitoba.....	52	175		178	691				3,290	1,710	229	374		
British Columbia.....	1,151	3,905		78	375						1,229	4,280		
P. E. Island.....	5,998	12,440		400	978						6,398	13,418		
	51,400	87,613	1.63	15,768	32,295	2.02					67,518	97,135	1.67	
Note.—* To Quebec from France.														
1881.														
Ontario.....	18,150	25,897		5,748	2,811		947	2,861	585	2,041	18,195	27,740		
Quebec.....	28,906	150,787		3,385	9,504			112	128		3,678	10,125		
Nova Scotia.....	33,533	52,551		3,532	6,275			4819	12,076	358	437	37,543	59,183	
New Brunswick.....	37,035	57,931		1,539	3,890							38,572	60,411	
Manitoba.....	1,780	2,540		62	193						1,842	2,733		
British Columbia.....	5,383	8,436		2,125	7,217						7,508	15,633		
P. E. Island.....	10,713	16,045		78	188						10,791	16,233		
N. W. Territories.....				25	122						25	122		
	58,957	81,707	1.47	16,841	17,180	2.88					60,182	92,661	1.54	

DETAILS OF IMPORTATIONS OF BARS AND ROIDS.—Continued.

To	Great Britain.			United States.			Norway and Sweden.		Belgium.		TOTALS.		
	Cwts.	Value.	Average.	Cwts.	Value.	Average.	Cwts.	Value.	Cwts.	Value.	Cwts.	Value.	Average.
1882.		\$	\$		\$	\$	\$	\$				\$	\$
Ontario.....	334543	472445	.....	6732	16136	.....	180	1081	.....	341755	180632	.....	.....
Quebec.....	41807	62904	.....	5604	11502	.....	17048	13150	.....	411549	68673	.....	.....
Nova Scotia.....	40335	49342	.....	794	977	.....	*	3	.....	41432	50323	.....	.....
New Brunswick.....	50420	76123	.....	1065	2080	.....	.....	.....	.....	51515	78263	.....	.....
Manitoba.....	2047	2566	.....	167	439	.....	.....	.....	.....	2214	3065	.....	.....
British Columbia.....	2406	4346	.....	2197	9304	.....	.....	.....	.....	4003	13650	.....	.....
P. E. Island.....	8386	12918	.....	1	3	.....	.....	.....	.....	8081	12839	.....	.....
N. W. Territories.....	.....	.....	.....	45	212	.....	.....	.....	.....	45	212	.....	.....
	857238	1243722	1.45	16725	40651	2.43	17528	14230	.....	80194	1328616	1.49	.....
				* From New found land.									
1883.													
Ontario.....	346512	493750	.....	8075	21408	.....	2157	1318204	3022	352788	522588	.....	.....
Quebec.....	265982	624727	.....	1656	4230	.....	11885	96322	.....	412527	665279	.....	.....
Nova Scotia.....	40533	60833	.....	1513	3080	.....	.....	161	608	12527	64530	.....	.....
New Brunswick.....	51474	79185	.....	130	936	.....	.....	.....	.....	51704	80111	.....	.....
Manitoba.....	8961	16411	.....	1414	2430	.....	.....	.....	.....	16375	18841	.....	.....
British Columbia.....	15487	23910	.....	8983	29150	.....	.....	.....	.....	24170	52160	.....	.....
P. E. Island.....	7187	16770	.....	.....	.....	.....	.....	.....	.....	7187	16770	.....	.....
N. W. Territories.....	.....	.....	.....	22	82	.....	.....	.....	.....	22	82	.....	.....
	850556	1308686	1.52	21803	61405	2.80	17042	106402505	3630	1000006	1414361	1.56	.....
1884.													
Ontario.....	217573	300231	.....	7840	19503	.....	958	2080	.....	236011	321822	.....	.....
Quebec.....	353469	530817	.....	2044	7979	.....	9404	21552	.....	365816	564348	.....	.....
Nova Scotia.....	39948	54537	.....	488	878	.....	.....	1648	1875	39084	57290	.....	.....
New Brunswick.....	41783	62426	.....	634	1915	.....	238	594	.....	42656	64635	.....	.....
Manitoba.....	3465	4783	.....	188	504	.....	.....	.....	.....	3593	5287	.....	.....
British Columbia.....	14697	21081	.....	6279	19528	.....	.....	.....	.....	26656	40069	.....	.....
P. E. Island.....	8936	13757	.....	.....	.....	.....	.....	.....	.....	8936	13757	.....	.....
N. W. Territories.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	676810	991640	1.46	18013	59307	2.79	10600	242261648	1875	707071	1068048	1.51	.....

DETAILS OF IMPORTATION OF IRON AND STEEL RAILS

Railroad Bars and Frogs, Wrought Iron or Steel Chairs and Fish-plates, and Car Axles.

[illegible]

See: Russ.

STEEL RAILS.										* IRON RAILS.		
Great Britain.			United States.			TOTAL.			Great Britain and United States.			
	Tons.	Value.	Ave.	Tons.	Value.	Ave.	Tons.	Value.	Ave.	Tons.	Value.	Ave.
Ontario	1480	\$ 60104	\$	130	\$ 2016	\$	1628	\$ 61020	\$	1968	\$ 54519	\$
Quebec	25344	1002249		171	15355		26286	617806		8035	255999	
Nova Scotia	1183	225015					1183	225015		1902	37540	
New Brunswick							43	43		489	123051	
British Columbia	10	407		280	8018		290	9325				
P. E. Island.....	363	22361		1-5	20		4631.5	22281				
	32001	1308036	40.87	1200	28454	23.74	33204	1336490	40.25	16796	510673	30.42
										* IRON RAILS.		
										Tons.		
From Great Britain.....										12548		
" United States.....										448		
Total										16796		
										510673		

1578

1878.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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1879.

1879.									
Ontario.....	2023	87067	673	18191	2086	105861	255	8135	
Quebec.....	18173	602220	19	672	18492	602892	5301	135201	
Nova Scotia.....	1113	18839	11	68	1115	18925	178	16781	.....
New Brunswick.....	1151	26175	.....	.....	1151	26175	785	18761	.....
British Columbia.....	.....	.....	.....	.....	.....	.....	206	11703	.....
P. E. Island.....	.....	.....	.....	.....	.....	.....	27	692	.....
23063	764921	3349	693	18634	2732	26718	78385	3100	6810
* IRON RAILS.									
From Great Britain.....							4905	150066	
" United States.....							1935	60915	
Total.....							6840	201775	

DETAILS OF IMPORTATIONS OF STEEL RAILS.

To	Great Britain.		United States.		Great Britain.		United States.		TOTALS.	
	Tons.	Value, Avege.	Tons.	Value Avege.	Tons.	Value, Avege.	Tons.	Value, Avege.	Tons.	Value, Avege.
1880.										
Ontario	3544	93362							3544	93362
Quebec	68101	1921272	2	203					68103	1921567
Nova Scotia ..	228	8730		100					235	9130
N. Brunswick ..	4488	103936							4488	103936
Btsh Columbia ..			38	2387					38	2387
P. E. Island ..	58	2222							58	2222
	76031	219552	27	94	18	3980	64	16	76080	219562

1881.										
Ontario	8602	219125							8602	219125
Quebec	65783	2281775	2	230					66079	2291005
Nova Scotia ..	746	22638		9000					746	22638
N. Brunswick ..	14221	143121							14221	143121
Manitoba										
Btsh Columbia ..										
P. E. Island ..										
N. W. Ter										
	80551	266658	33	20	285	10130	37	73	80640	267088

* Total includes from Belgium to Quebec, 203 Tons, \$9,900.

1882.										
Ontario	18781	517490		915	31782				19696	549272
Quebec	44065	1126044		200	7400		22702	566695	66067	2001139
Nova Scotia ..	1382	63331							1382	63331
N. Brunswick ..	9246	330604			198				9246	330604
Manitoba				5310	230883				16527	308887
Btsh Columbia ..	245	7800					11017	318202	245	7800
P. E. Island ..										
N. W. Ter										
	73653	2356308	31	96	6625	260065	39	25	73702	2366065

Total, 80,278 tons. \$2,616,433 value.

Total, 33,719 tons. \$944,897 value.

1883.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</
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Total, 67,711 tons. \$2,225,851 value.

Total, 55,142 tons. \$1,790,428 value.

* Total includes Quebec from Germany 117 tons, \$4979. Quebec from Belgium 2 tons, \$103.

1884.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</
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Total, 43,618 tons. \$1,089,517 value.

Total, 66,719 tons. \$1,705,418 value.

MILEAGE AND PARTICULARS OF CANADIAN RAILWAYS.

Year ending June 30th.	MILEAGE IN OPERATION.	ANNUAL INCREASE.	MILEAGE OF STEEL RAILS.		MILEAGE OF IRON RAILS.		MILEAGE OF SIDINGS.	
			Mileage.	Increase.	Mileage.	Decrease.	Mileage.	Increase.
1867.....	2,218							
1868.....	2,390	172						
1869.....	2,400	70						
1870.....	2,608	148						
1871.....	2,679	71						
1872.....	2,928	249						
1873.....	3,478	550						
1874.....	4,100	622						
1875.....	4,826*	726	2,054.75*		2,746.75*	Increase.	955.50	
1876.....	5,157	331	2,373.75	319.00	2,758.00	11.75	637.00	
1877.....	5,574	417	2,765.25	391.50	2,783.50	25.50	688.00	51.00
1878.....	6,143	569	3,383.08	817.75	3,258.25	474.75	747.75	59.75
1879.....	6,484	341	3,813.80	230.72	3,177.25	Decrease. 81.00	743.57	
1880.....	6,891	407	4,049.53	235.73	3,157.41	19.81	783.26	39.69
1881.....	7,290	399	4,935.15	885.62	2,960.66	496.78	878.47	95.21
1882.....	7,530	270	6,085.41	1,150.26	1,983.53	677.13	952.89	74.42
1883.....	8,726	1,196	7,340.67	1,255.26	1,725.30	258.23	1,099.80	146.91
1884.....	9,575	849	8,349.18	1,007.41	1,601.37	123.93	1,165.29	65.49
Miles laid with rails but not in operation.....	373		Increase since 1875	6,293.25	Decrease since 1875	1,144.98	Increase since 1875	509.22
Miles of Sidings.....	1,165							
Total rails laid.....	11,113							
1884.....			ESTIMATED WEIGHT OF IRON AND STEEL RAILS IN CANADIAN RAILWAYS.					
Miles under construction.	1,565							

* Official Returns since 1875.

Not including Lines of Railway owned by Coal and Iron Mines.

	Gross Tons.
8,348 Miles of Steel Rails @ 56 lbs. per yard = 88 tons per mile	734,624
1,662 " Iron " " "	140,976
1,165 " Rails in Sidings " "	102,520
11,115 Miles. TOTAL WEIGHT OF RAILS.....	978,120
Estimated weight of Spikes, Track-bolts, and Fish-plates.....	91,013
Grand Total	1,069,133

TABLE OF THE EXPORTS OF IRON ORE, MANGANESE ORE, PIG IRON, AND
SCRAP IRON FROM THE DOMINION OF CANADA.*Compiled from Trade and Navigation Returns.*

NET TONS—2000 lbs.

Fiscal Year ending June 30th.	IRON ORE.		MANGANESE ORE.		Fiscal Year ending June 30th.	PIG IRON.		SCRAP IRON.	
	Tons, 2,000 lbs.	Value, \$	Tons, 2,000 lbs.	Value, \$		Tons, 2,000 lbs.	Value, \$	Tons, 2,000 lbs.	Value, \$
1868	25,312	54,723	1,017	2,5719	1868	7,329	107,728		
1869	27,848	60,228	188	10,800	1869	9,371	152,017		
1870	15,232	31,827	1,402	7,682	1870	16,331	241,337		
1871	26,825	58,068	1,656	9,788	1871	16,331	280,337		
1872	26,175	61,264	1,206	28,500	1872	32,045	516,621		
1873	17,390	112,906	878	17,171	1873	29,060	532,082		
1874	14,278	97,740	977	17,246	1874	81,391	365,813		
1875	32,143	75,917	777	15,716	1875	13,913	234,632		
1876	14,286	30,702		4,355	1876	11,336	199,928		
1877	7,755	14,854	720	13,508	1877	3,616	35,172		
1878	5,421	13,405	1,006	16,339					
1879	3,562	7,539	589	11,080					
1880	30,521	76,474	2,065	27,732	1878	10,012	37,836		
1881	44,677	114,850	2,401	38,758	1879	805	34,498		
1882	43,835	135,463	1,425	37,485	1880	2,846	72,023		
1883	44,944	138,775	1,194	29,417	1881	11	179		
1884	25,308	66,549	883	15,851	1882	65	1,000		
					1883	14	317		
					1884	3	66		

TABLE OF THE EXPORTS OF HARDWARE, MACHINERY, Etc., Etc., FROM
THE DOMINION OF CANADA.*Compiled from Trade and Navigation Returns.*

Fiscal Year ending June 30th.	Stoves.	Other Castings.	Other Hardware and Iron.	Machinery.	Sewing Machines.	Agricultural Implements.	Steel and Manu- factures of.
Year.	\$	\$	\$	\$	\$	\$	\$
1868			150,411	92,380	52,901		
1869			122,847	65,913	60,993		
1870			147,931	33,749	116,149		
1871			173,582	11,815	170,293		
1872			195,720	105,548	227,661		
1873			307,057	66,336	366,231		
1874			252,141	38,769	252,473		
1875			197,180	40,763	251,510		
1876			95,283	60,308	305,749		
1877		7,527	68,733	96,265	260,115		78,114
1878		12,124	102,983	77,182	273,258	86,001	32,618
1879	5,270	13,555	81,995	51,205	218,601	79,911	314,672
1880	1,552	20,677	92,588	17,193	201,545	59,128	78,451
1881	3,309	14,387	84,713	20,210	165,452	31,269	113,656
1882	1,035	7,895	209,548	77,432	150,643	16,142	96,266
1883	798	6,679	319,217	74,366	69,933	16,766	43,812
1884	1,554	11,752	217,389	82,491	95,326	17,252	30,781

Years ending
Dec. 31st.

(a)

1867

1868

1869

1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

NOTE.

Year ending
June 30th.

1868

1869

1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

*—Inc.

PRODUCTION OF COAL IN THE DOMINION OF CANADA.

Compiled from Official Returns.

GROSS TONS - 2,240 LBS.

Years ending Dec. 31st.	BRITISH COLUMBIA.				NOVA SCOTIA.				Total Production in the Dominion. Gross Tons of 2,240 lbs.	Total Production in the Dominion. Net Tons of 2,000 lbs.
	Export to San Francisco.	Total Export.	Local Con- sump'tn.	Total Pro- duction.	Export to United States.	Total Sales.	Colliery Con- sumption.	Total Production.		
1867.	(a) 14,800			(b) 31,230	(c) 338,492	471,185	61,254	532,439	563,678	631,319
1868.	23,300			(b) 41,005	228,132	453,624	58,971	512,595	556,600	623,392
1869.	14,900			(b) 35,892	257,485	511,795	66,267	578,062	613,864	687,527
1870.	12,600			(b) 29,843	168,180	508,277	57,492	565,769	655,612	734,285
1871.	15,600			(b) 45,000	165,431	596,418	76,824	673,242	718,212	804,431
1872.	26,000			(b) 46,148	151,692	785,914	101,341	887,250	927,098	1,038,349
1873.	31,400			(c) 45,725	264,559	884,106	108,338	1,051,467	1,095,190	1,228,852
1874.	51,000			(d) 81,000	138,335	749,127	119,782	872,730	953,730	1,068,166
1875.	61,000			110,000	89,746	706,736	124,110	781,165	891,165	998,104
1876.	101,000			130,000	71,834	634,207	113,788	709,646	848,646	950,483
1877.	102,400			151,000	118,216	697,065	98,841	757,496	911,496	1,020,875
1878.	140,300	(d) 164,682	(d) 26,116	171,000	88,495	603,511	88,627	770,003	941,603	1,099,565
1879.	150,100	192,096	40,294	241,000	51,611	688,624	84,787	788,271	1,029,271	1,152,783
1880.	169,200	225,849	46,513	268,000	123,123	954,659	96,831	1,052,710	1,300,710	1,456,795
1881.	158,600	189,223	40,191	228,000	113,728	1,035,014	107,888	1,142,710	1,382,270	1,544,542
1882.	153,800	232,411	56,161	282,000	99,322	1,230,179	111,384	1,395,841	1,647,841	1,845,548
1883.	128,503	149,367	64,786	213,000	102,755	1,257,323	111,949	1,422,553	1,625,553	1,831,819
1884.	201,546	306,478	87,388	394,070	64,515	1,294,650	116,760	1,380,285	1,578,395	1,807,238

NOTE. a.—"Information for Emigrants." Published by Minister of Agriculture B.C., 1884, p. 49.

b.—Report of Hon. H. L. Langevin, C.B., on British Columbia, 1872, p. 13.

c.—The Coal Trade, N.Y., 1877, p. 31.

d.—Report of Minister of Mines, British Columbia, 1885, p. 425.

e.—The Duty on Coal entering the United States was \$1.25 per ton from 1867 to 1871, and 75 cents per ton since then.

IMPORTS OF COAL FOR HOME CONSUMPTION.

Compiled from Trade and Navigation Returns.

NET TONS - 2,000 LBS.

Year ending June 30th.	ANTHRACITE.		BITUMINOUS.		ALL OTHER & DUST.		COKE.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1868.		\$		\$		\$		\$	356,836	1,377,585
1869.									389,485	1,398,908
1870.									394,662	1,385,245
1871.									366,073	1,352,100
1872.									484,826	2,015,247
1873.									574,508	2,558,725
1874.									804,827	3,806,353
1875.									652,435	3,076,088
1876.									703,880	3,320,060
1877.	420,010	1,793,407	513,350	1,706,154	* 45,712	161,267			979,092	3,660,928
1878.	406,971	1,476,926	466,090	1,493,309	31,737	85,651	1,648	7,391	896,446	3,662,150
1879.	416,423	1,506,988	473,317	1,420,264	20,439	53,993	995	4,386	911,174	2,885,241
1880.	516,729	1,509,900	457,049	1,220,761	3,965	8,877	3,837	19,353	982,743	2,762,892
1881.	572,092	2,025,937	587,024	1,741,568	337	606	Gas Coke 1,563	3,941	1,696,196	4,097,322
1882.	638,273	2,006,356	636,374	1,992,081	471	906	Other " 5,492	26,123	1,284,417	4,690,352
1883.	754,891	3,344,936	911,620	2,966,198	8,154	10,623	Gas " 1,251	3,028	1,683,951	6,301,369
1884.	808,060	3,831,283	1,118,615	3,613,470	258	1,085	Gas " 1,142	3,345	2,010,936	7,505,399
					Dust 12,524	13,515	Other " 334	1,619		
							Gas " 11,297	44,518		
							Gas " 332	1,528		

*—Including Coke.

TOTAL CONSUMPTION OF COAL IN THE DOMINION.

Compiled from Trade and Navigation, and Official Returns.

YEAR.	BITUMINOUS COAL.						IMPORTS.		TOTAL CONSUMPTION.		TOTAL DOMINION CONSUMPTION.
	IMPORTS.		EXPORTS.		BALANCE AGAINST CANADA.		EXCESS OF IMPORTS OVER EXPORTS.		Total Excess of Imports over Exports.	Total Dominion Production	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Bituminous Dust and Coke.	Anthracite.	Tons.	Tons.	
	2,000 lbs.	\$	2,000 lbs.	\$	2,000 lbs.	\$	Tons.	Tons.	Tons.	Tons.	
	Bituminous.						Tons 2,000 lbs.		2,000 lbs.	2,000 lbs.	2,000 lbs.
1868.			265,335	640,708			91,501		91,501	623,392	714,893
1869.			440,308	763,262			50,823*			687,527	636,704
1870.			268,707	588,799			125,345		125,345	734,285	859,630
1871.			318,287	662,451			47,786		47,786	804,431	852,217
1872.			295,522	578,991			189,304		189,304	1,038,349	1,227,653
1873.			401,757	951,886			160,551		160,551	1,228,852	1,388,403
1874.			418,357	1,043,729			386,470		386,470	1,068,166	1,454,636
1875.			288,176	937,923			364,250		364,250	908	1,362,363
1876.	Bituminous.		277,832	977,188	Bituminous.		516,048		516,048	950,483	1,466,531
1877.	513,970	1,706,154	249,536	855,908	264,434	850,186	310,146	429,010	739,156	1,029,875	1,751,031
1878.	456,090	1,493,160	340,127	1,210,687	115,963	282,482	149,348	400,971	550,319	1,109,595	1,965,814
1879.	473,317	1,420,264	315,793	937,268	157,524	482,996	178,958	416,423	595,381	1,152,783	1,748,164
1880.	457,049	1,220,761	341,694	1,013,899	115,355	266,862	121,320	516,729	638,049	1,456,795	2,094,844
1881.	587,024	1,741,568	429,055	1,123,091	166,966	618,077	174,046	572,092	746,138	1,514,542	2,230,680
1882.	636,374	1,992,081	421,311	1,078,704	215,063	913,377	224,833	638,273	863,106	1,845,548	2,708,654
1883.	911,629	2,906,198	430,081	1,087,411	481,548	1,908,787	498,979	754,891	1,253,870	1,831,819	3,085,689
1884.	1,118,615	3,613,470	451,631	1,201,172	666,984	2,412,238	691,305	868,000	1,559,305	1,997,368	3,556,673

* Exports over Imports.

The Total Dominion Consumption, is not actually correct, as the Trade and Navigation Returns, are for Fiscal years, ending June 30th, whilst the Reports of the Minister of Mines of the Provinces of British Columbia, and Nova Scotia continue to December 31st of each year.

TOTAL DOMESTIC CONSUMPTION.

Tons.

2,000 lbs.

714,893
636,704
859,630
852,217
1,627,653
1,308,463
1,454,636
1,362,363
1,466,531
1,751,031
1,065,814
1,748,164
2,004,844
2,260,080
2,708,054
3,085,689
3,556,673

are for
lumber,

STATEMENT showing the quantities or values, of some of the principal articles of imported merchandise, entered for consumption, in the United States, compared with corresponding entries, into the Dominion of Canada; the average rates of duty, and amounts of duty received; also the consumption and duty per capita of population during the fiscal year ended June 30, 1887.

NOTE.—The population of the United States is estimated at 51,362,000, and of Canada at 4,000,000.

Compiled from tables prepared by the Committee on Finance, United States Senate, and holds of the Trade and Navigation of the Dominion of Canada.

ARTICLES.	QUANTITIES AND VALUES.		Average Rate of Duty on Dutiable.	Ordinary Duty Received.	Consumption per Capita of Free and Dutiable.	Duty per Capita.
	Free of Duty.	Dutiable.				
COTTON and Manufactures of.		Dollars.		Dollars.		
United States (<i>raw cotton free of duty</i>).....	802,148	32,550,244	37.81 per cent.	1,223,371	61.22 cents.	22.59 cents.
Canada (<i>raw cotton free of duty</i>).....	2,912,772	10,044,632	22.13 per cent.	2,221,983	294.07 cents.	50.20 cents.
GLASS and Manufactures of.						
United States (<i>old and broken glass duty free</i>).....	379	7,397,897	55.65 per cent.	4,182,617	14.03 cents.	7.72 cents.
Canada.....	.....	1,176,912	28.11 per cent.	339,856	26.71 cents.	7.50 cents.
IRON & STEEL and Manufactures of.						
United States.....	.....	40,837,376	40.63 per cent.	16,590,504	75.40 cents.	30.63 cents.
Canada.....	.....	13,714,636	21.75 per cent.	2,983,704	455.80 cents.	67.72 cents.
LEATHER and Manufactures of.						
United States (<i>old scrap leather free</i>).....	.....	12,653,722	29.80 per cent.	3,770,547	23.36 cents.	6.96 cents.
Canada.....	.....	2,052,348	22.29 per cent.	453,185	46.12 cents.	10.27 cents.
SILK, Raw, and Manufactures of.						
United States (<i>raw silk free of duty</i>).....	14,042,696	33,307,112	59.01 per cent.	19,654,946	87.42 cents.	36.29 cents.
Canada (<i>raw silk free of duty</i>).....	160,178	2,916,638	29.56 per cent.	861,018	69.81 cents.	19.35 cents.
SUGAR, Brown, and all other.						
United States (<i>from Hawaiian Islands free</i>).....	114,132,970	1,927,853,706	2.31 cents per lb.	44,517,851	37.70 pounds.	82.19 cents.
Canada.....	.....	152,729,569	1.62 cents per lb.	2,467,751	34.61 pounds.	56.00 cents.
Canada.....	.....	85,091,530	48.46 per cent.	.....	115.55 cents.	.....
WOOD and Manufactures of.						
United States.....	Dollars.					
Canada.....	4,565,064	9,530,364	17.87 per cent.	1,763,096	26.02 cents.	3.14 cents.
Canada.....	1,226,929	2,197,402	24.57 per cent.	339,905	77.71 cents.	12.25 cents.
WOOL and Manufactures of.						
United States.....	.....	51,044,444	63.32 per cent.	32,320,893	94.24 cents.	59.67 cents.
Canada.....	.....	10,106,561	26.61 per cent.	2,689,754	275.98 cents.	61.04 cents.

The Articles of Iron, Steel, and manufactures thereof, admitted Free of Duty into Canada, are **manufactured articles** not **raw materials**; the average Rate of Duty, on the Total of these Free and Dutiable articles, is **14.85 per cent.**

IMPORTATIONS OF IRON AND STEEL INTO THE DOMINION OF CANADA.

Compiled from Official Returns.

Statement showing the values of imported iron and steel and manufactures thereof, entered for consumption in the Dominion of Canada, the average rates of duty, and amounts of duty received, also the consumption and duty per capita of population, during the fiscal years ended June 30th, from 1868 to 1884 inclusive.

NOTE.—Population estimated from Official Statistics.

Year ended June 30.	QUANTITIES & VALUES.		Average Rate of Duty on Dutiable.	Ordinary Duty Received.	Total Value of Free and Dutiable.	Consumption per Capita of Free and Dutiable.	Duty per Capita.	Total Value Including Duty.
	Free of Duty.	Dutiable.						
1868	3,549,067	3,331,298	12.77 per cent.	433,024.62	6,885,265	204.47 cents.	12.65 cents.	7,311,389.62
1869	3,280,928	4,523,852	10.98 per cent.	496,733.91	7,855,780	216.78 cents.	14.58 cents.	7,882,513.91
1870	3,102,711	4,618,156	11.14 per cent.	517,833.95	7,720,867	224.89 cents.	15.02 cents.	8,208,700.35
1871	4,019,082	6,789,563	11.39 per cent.	773,494.92	10,808,645	301.00 cents.	22.19 cents.	11,582,139.92
1872	7,548,311	8,364,868	11.12 per cent.	930,020.16	15,913,179	454.85 cents.	26.58 cents.	16,843,199.16
1873	13,166,036	12,268,984	11.05 per cent.	1,356,132.41	25,425,020	701.41 cents.	28.07 cents.	26,791,152.41
1874	8,808,566	11,892,021	12.31 per cent.	1,464,157.29	20,700,587	577.16 cents.	40.46 cents.	22,064,814.29
1875	8,169,400	10,808,708	12.73 per cent.	1,378,579.76	18,978,198	515.31 cents.	47.39 cents.	20,777,977.76
1876	5,463,965	7,504,812	12.62 per cent.	947,290.43	12,965,117	345.76 cents.	25.26 cents.	13,912,407.43
1877	3,561,420	6,520,891	12.14 per cent.	935,096.17	11,082,221	289.38 cents.	24.44 cents.	12,018,417.17
1878	2,531,513	6,866,703	13.20 per cent.	906,491.76	9,388,206	210.38 cents.	23.18 cents.	10,594,797.76
1879	1,795,512	6,166,783	15.08 per cent.	930,858.57	7,962,265	199.57 cents.	23.30 cents.	8,892,653.57
1880	3,202,667	6,925,963	19.74 per cent.	1,367,691.79	10,128,660	248.89 cents.	35.60 cents.	11,496,351.79
1881	4,357,665	8,508,250	19.97 per cent.	1,717,091.49	12,865,855	267.69 cents.	39.45 cents.	14,672,946.49
1882	5,197,514	12,301,574	21.08 per cent.	2,593,994.04	17,499,488	404.63 cents.	60.98 cents.	20,063,482.04
1883	6,365,638	13,714,636	21.75 per cent.	2,983,763.12	20,480,251	455.80 cents.	67.72 cents.	23,069,975.12
1884	4,365,831	10,424,806	20.82 per cent.	2,170,634.84	14,790,727	332.29 cents.	48.76 cents.	16,961,661.84
Aggregate for 17 yrs.	88,057,036	142,684,448		21,897,120.44	230,711,434			252,638,613.44

IMPORTATIONS OF IRON AND STEEL INTO THE UNITED STATES.

Extract from a Report prepared by the Committee on Finance, United States Senate, 1884.

Statement showing the values of imported iron and steel and manufactures thereof, entered for consumption in the United States, including both entries for immediate consumption and withdrawals from warehouses for consumption, the average rates of duty, and amounts of duty received; also the consumption and duty per capita of population, during the fiscal years ended June 30 from 1867 to 1883, inclusive.

NOTE.—In the consumption of iron per capita, additional and discriminating duty is excluded. The estimate of population is made by E. B. Elliott, Esq., Actuary of the Treasury Department. In 1870 and 1880 the population was enumerated.

Year ended June 30.	Estimated Population.	QUANTITIES & VALUES.		Average rate of duty on dutiable.	Ordinary duty received.	Consumption per capita of free and dutiable.	Duty per capita.
		Free of Duty.	Dutiable.				
1867	36,211,000		\$ 24,996,275	45.96 per cent.	\$ 11,474,384	69.03 cents.	31.69 cents.
1868	36,793,000		22,521,292	48.01 per cent.	10,813,102	61.21 cents.	29.39 cents.
1869	37,550,000		28,057,171	49.21 per cent.	13,818,101	74.37 cents.	36.60 cents.
1870	38,588,371		32,499,190	46.55 per cent.	15,125,100	84.26 cents.	39.23 cents.
1871	39,565,000		33,256,120	45.14 per cent.	18,658,084	109.55 cents.	47.17 cents.
1872	40,895,000		62,890,457	41.45 per cent.	21,922,127	130.27 cents.	53.93 cents.
1873	41,676,000		57,333,158	31.81 per cent.	18,237,380	137.47 cents.	43.73 cents.
1874	42,759,000		31,709,345	31.46 per cent.	10,920,400	80.99 cents.	25.48 cents.
1875	43,919,000		20,474,244	33.28 per cent.	6,814,200	46.47 cents.	15.47 cents.
1876	45,135,000		12,871,385	36.21 per cent.	4,660,800	28.40 cents.	10.28 cents.
1877	46,551,000		10,222,220	36.81 per cent.	3,765,846	21.92 cents.	8.07 cents.
1878	47,895,000		8,528,511	38.47 per cent.	3,280,618	17.77 cents.	6.84 cents.
1879	48,865,000		9,091,365	37.97 per cent.	3,691,094	19.62 cents.	7.45 cents.
1880	50,155,783		15,466,986	42.19 per cent.	19,180,625	90.66 cents.	38.25 cents.
1881	51,462,000		51,451,574	41.71 per cent.	21,462,534	99.99 cents.	41.71 cents.
1882	52,799,000		53,998,267	44.77 per cent.	24,175,547	102.27 cents.	45.79 cents.
1883	54,163,000		40,837,376	40.63 per cent.	16,500,504	75.40 cents.	30.63 cents.

TABLE showing the Grand Aggregate Trade of the Dominion of Canada, from 1868 to 1881 inclusive, on the basis of "TOTAL EXPORTS and Imports;" the Value of all Goods entered for Consumption, with the Duty collected thereon, and the Value of the Imports of Iron, Steel, and Manufactures thereof, entered for consumption, and the Duty collected thereon.

(Compiled from Trade and Navigation Returns.)

YEAR.	TOTAL EXPORTS.	TOTAL IMPORTS.	GRAND TOTAL IMPORTS AND EXPORTS.		TOTAL IMPORTS ENTERED FOR CONSUMPTION IN THE DOMINION.		IRON, STEEL, AND MANUFACTURES THEREOF ENTERED FOR CONSUMPTION.	
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
1868.....	57,567,888	73,459,644	131,027,532	71,985,306	8,819,431.63	6,885,395	426,024.62	
18 9.....	60,474,781	70,415,165	130,889,946	67,402,170	8,298,909.71	7,358,780	496,733.91	
1870.....	73,573,490	74,814,339	148,387,829	71,297,663	9,462,940.44	7,750,867	517,833.95	
1871.....	74,173,618	96,092,971	170,266,589	86,947,482	11,843,655.75	10,808,645	773,494.92	
1872.....	82,639,663	111,430,527	194,070,190	107,709,116	13,045,463.30	15,913,179	930,020.16	
1873.....	89,789,922	128,011,281	217,801,203	127,514,594	13,017,730.17	25,435,029	1,336,132.41	
1874.....	89,351,998	128,213,582	217,565,510	127,404,169	14,421,882.67	20,700,387	1,464,457.20	
1875.....	77,886,979	123,070,283	200,957,262	119,618,657	15,261,382.12	18,999,198	1,378,779.76	
1876.....	80,966,435	93,210,346	174,176,781	94,733,218	12,833,114.48	12,965,117	947,290.43	
1877.....	75,875,393	99,327,962	175,203,355	96,300,483	12,548,451.60	11,082,321	926,066.17	
1878.....	79,323,667	93,081,787	172,405,454	91,139,577	12,795,693.17	9,398,306	906,491.76	
1879.....	71,491,255	81,964,427	153,455,682	80,341,698	12,939,540.66	7,962,295	930,358.57	
1880.....	87,911,458	86,489,747	174,401,205	71,782,349	14,138,849.22	10,128,060	1,297,691.79	
1881.....	98,290,823	105,330,840	203,621,663	91,311,604	18,500,785.97	12,955,855	1,717,091.49	
1882.....	102,137,263	119,419,500	221,556,763	112,618,327	21,708,837.43	17,499,488	2,536,994.44	
1883.....	98,085,804	132,254,022	230,339,826	123,137,019	23,172,308.97	20,080,274	2,983,703.42	
1884.....	91,406,496	116,397,043	207,803,539	108,180,644	20,164,963.37	14,790,727	2,170,934.84	
Aggregate for 17 years..	1,390,946,803	1,732,983,466	3,123,930,269	1,649,754,526	243,075,970.35	230,741,434	21,897,139.44	

Excess of Imports over Exports since Confederation..... \$ 342,033,663
 Average per year..... 20,119,804
 Average Importation, for Home Consumption, of Iron, Steel, and Manufactures thereof, per year..... 13,573,003

The following table gives the production of Pig Iron, Steel and Coal, in the iron and steel producing countries of the world, in the most recent years for which statistics are available. English tons of 2,240 pounds are used in giving the statistics of Great Britain, the United States, Russia, and "other countries," and metric tons of 2,204 pounds for all the continental countries of Europe, except Russia. As the difference between the gross ton and the metric ton is so trifling, it is not necessary to change the official figures.¹

COUNTRY.	PIG IRON.		STEEL.		COAL.	
	Year.	Tons.	Year.	Tons.	Year.	Tons.
Great Britain	1884	7,528,966	1884	1,861,641	1884	160,757,815
United States	1884	4,097,868	1884	1,550,879	1884	99,851,807
Germany and Luxemburg...	1884	3,572,155	1883	1,060,591	1883	70,442,648
France	1884	1,855,247	1884	509,516	1884	20,127,209
Belgium	1884	738,105	1884	179,803	1884	18,041,000
Austria and Hungary	1883	701,037	1883	271,733	1883	17,047,961
Russia	1882	498,400	1882	225,140	1882	3,742,380
Sweden	1883	422,627	1883	69,505	1882	250,000
Spain	1883	139,920	1873	216	1880	847,128
Italy	1883	53,000	1881	3,630	1882	220,000
Other Countries	1883	150,000	1883	20,000	1883	8,000,000
Total		19,757,325		5,752,654		399,327,948

EXPLANATION OF THE TABLES.

In the preceding tables, my endeavour has been to simplify the statistics of the importations of iron, steel and manufactures thereof, by classifying them as far as practicable, under the following heads:

1. Iron, etc.
2. Steel.
3. Rails, etc.
4. Castings and forgings.
5. Cutlery and edge tools, etc.
6. Hardware and manufactures.
7. Machinery and engines.

The importations of coal, followed by the exports of coal and iron, etc., complete the returns. The first tables of "IMPORTS FOR HOME CONSUMPTION" give an annual enumeration of the various articles under each heading. Each article is named, the quantity, or measure of weight, and value given, the rate of duty, if dutiable, or

¹ Extract from the Annual Report of the American Iron and Steel Association, 1885.

if free, so specified; together with the actual quantity, invoiced value, amount of duty paid thereon, and totals of the value and duty.

These are followed by the "TOTALS OF IMPORTS," which deal with the annual totals of each class. The invoice value of the Free Imports being separated from those which are dutiable, the amount of duty collected, together with the "total value including duty," complete the figures.

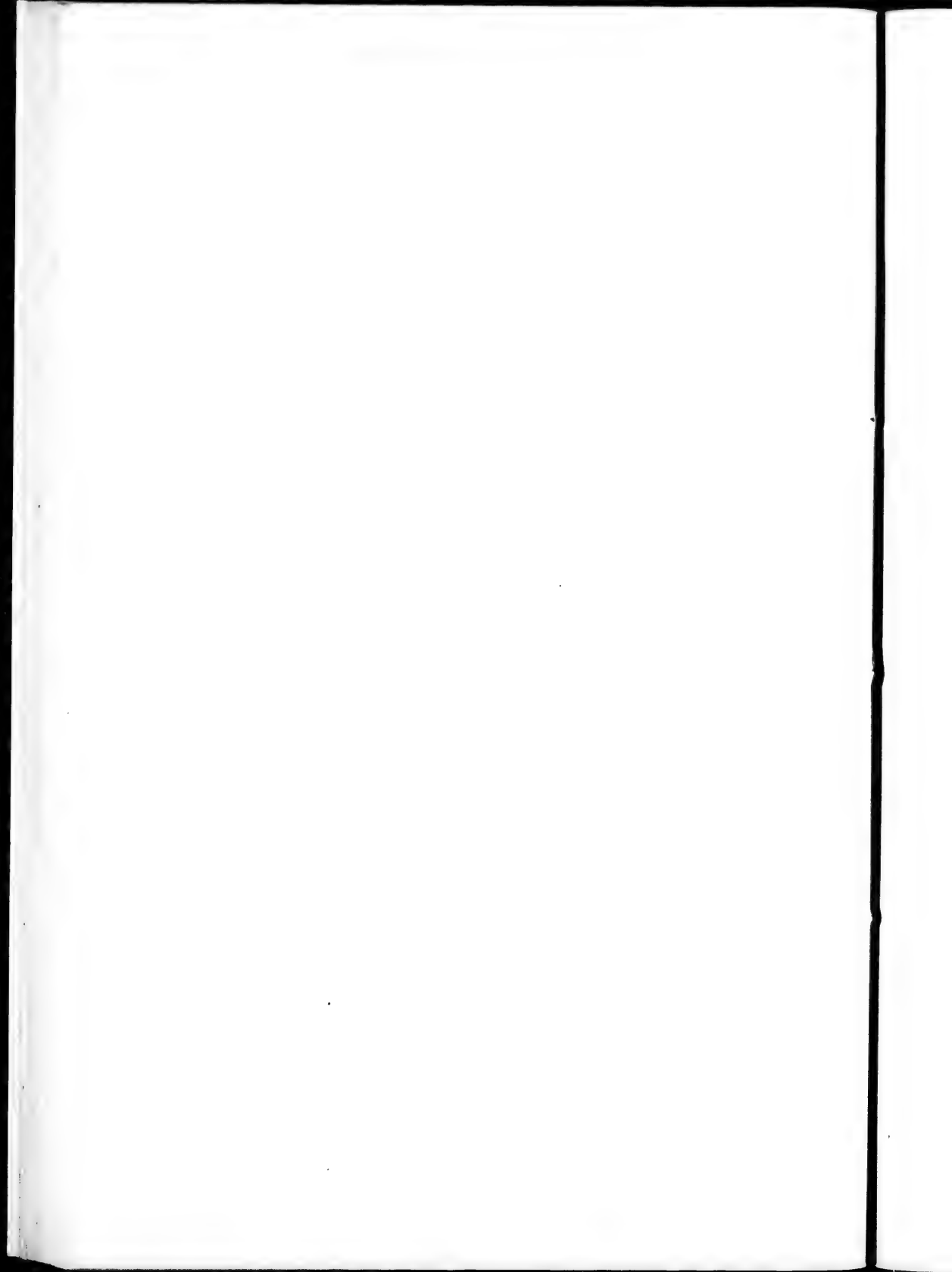
Next in order is a tabulated statement showing the "WEIGHTS OF SOME OF THE IMPORTATIONS," at the foot of which the "DOMESTIC PRODUCTION OF PIG IRON," appears.

To facilitate comparisons, two tables of totals are next given of the importations, from 1868 to 1884, for each year consecutively, the first shews the INVOICED VALUES, the other the TOTAL VALUES INCLUDING DUTY.

We now come to the "DETAILS OF IMPORTATIONS," wherein particulars of PIG IRON, PUDDLED BARS, BARS AND RODS, IRON AND STEEL RAILS, the countries from which these articles come invoiced, the Province into which they were entered, as well as the weights and values are given. In addition the annual average value, per ton of 2,000 pounds, or per hundredweight of 100 pounds, has been worked out. Fractional parts of a ton being omitted, the totals which are correct to the ton, do not exactly coincide with the entries in detail.

Following this is a table of "MILEAGE AND PARTICULARS OF CANADIAN RAILWAYS," which shows the annual increase in mileage, the miles laid with iron and also steel rails, with an estimate of the weight of metal now in Canadian railway tracks. From 1868 to 1875 all the distances cannot be verified, but subsequent to that year the figures are official.

Two tables of "Exports" giving the annual returns since Confederation arranged consecutively, are followed by three records of "The Coal Trade of the Dominion." The statistics of the Imports, Exports and Domestic Production of Iron, Steel and Coal of the Dominion of Canada, being supplemented by three statements showing the quantities or values of imports for home consumption, the average rates of duty; shewing also the consumption, and duty per capita of population in the United States and in Canada, both for seventeen years on iron and steel, and for one year on some other classes of merchandise, and by the total Imports and Exports of the Dominion, and a statement of "THE WORLD'S PRODUCTION OF PIG IRON, STEEL AND COAL."



NOTES
ON THE
MANUFACTURE OF IRON,
AND THE
IRON TRADE IN OTHER COUNTRIES.

Lord Bacon hath truly said that there are three things which make a nation great and prosperous—a fertile soil, busy workshops, and easy conveyance for men and commodities from one place to another.

With the first of these, a fertile soil, Canada has, by nature, been well endowed, whilst, as to the last of the three conditions, “easy conveyance for men and commodities,” our country is truly well furnished and equipped, her natural waterways and her canals being the most magnificent in the world, and her system of railways exceedingly commodious and extensive. Again, as respects the second of the Baconian conditions to national prosperity, the possession of “busy workshops,” Canada, more especially since the development of the National Policy, has, in a general sense, made great advances. There is though one special branch of Industry, wherein she has, to a degree almost painfully surprising, failed to attain any appreciable rank among the nations, and wherein she has indeed long lagged, and still lags, far behind in the march of material progress. We refer, of course, to that great industry, so valued by other nations when endowed by Nature with the means of cultivating it, the MANUFACTURE OF IRON. If, under the dispensation of Providence, the successful and profitable manufacture of iron in Canada was an impossibility or even a dangerous or difficult venture, we would be compelled philosophically to accept the position, just as we all of us, with repining,

submit to the veto of nature against the cultivation, on our lands, of sago, tea or oranges. Nature, however, most assuredly, has *not* placed any such veto on the manufacture of iron in our Dominion, but, on the contrary, has, in certain portions of our domain, most bountifully endowed us with all the essentials to the successful operation of this great industry. It is we ourselves who, through our apathy, want of knowledge, or through defective legislation, have so long failed, and are still failing, to duly recognize the immense possibilities which lie within our easy reach, but which, in our blindness, we fail to grasp and develop as we should do.

The relation of the various attempts to make iron in this country presents a sad record of loss and disappointment, of blasted hopes and shattered fortunes. These enterprises appear generally to have been undertaken by men of energy and ability,—but, unable to make headway against the competition of older countries, they had, one after another, to succumb. This persistent adversity of fate, at first, strikes one as strange, and, somewhat naturally, inclines one to assume that our country, so successful in many other lines of manufacture, must, inherently, suffer from some economical condition adverse to the successful prosecution of the iron industry. This though would, in fact, be a very erroneous conclusion, and against it we must carefully be on our guard. He, however, who, in this matter, studies thoughtfully the relation between cause and effect will, we think, not fail to perceive that the true cause of the past and present unsatisfactory position of the iron industry of Canada lies, not in any natural defects, not in the want of the necessary ways and means, but rather in the defective and unsound legislation against which this particular industry has, for so long, had to struggle. The examination of tariffs will reveal that our iron manufactures have been far less favorably dealt with than many other industries not more important, and that it is to the very scanty measure of protection hitherto accorded, that the persistent ill-success of this industry may, reasonably, be chiefly attributed.

A glance at the tabulated statements will convince any one, that our consumption of iron is large enough to justify the erection of a number of works and factories, and that there should be at least *ten thousand* more men employed in this industry than there are to-day.

In discussions upon the question of the manufacture of iron, pig and bar iron, are frequently spoken of as *raw materials*. This though is not the case. Pig iron and bar iron stand in the same relation to the

foundryman and blacksmith, that refined sugars do to the confectioner, or cotton and woollen cloths to the dressmaker and tailor; and the relative importance to the country generally of these manufactures is very much in favor of iron for the following reasons:—

We possess in unlimited abundance, the actual raw materials, coal, iron ore, and limestone, out of which iron is made, and to a certain extent, *we export them* in their raw condition.

We cannot produce and do not possess the raw cotton, silk, sugar and some wools, etc., for which reason, these raw materials are admitted free of duty. So not only are we impoverished by sending money away to pay for them, but we derive no revenue from their importation.

A further plea and a strong one, is the class of labor, wages earned and number of men employed, in the manufacture of iron, as compared with the other industries, strong, able-bodied men alone being required, in place of women and children.

Something too might be said about the kindred industries which are consequent upon the iron manufacture, and last, but not least, the advantage to our home carrying trade, by the transport of such immense quantities of goods.

CHAPTER VI.

Iron ores are the mineral from which both iron and steel are derived,—they are of various qualities and descriptions. Commercially to be of value, they must contain a certain proportion of metallic iron, and be free from, or not contain more than a certain proportion, of alien and deleterious substances.

Iron ores are sold on guaranteed analysis as to the percentage of metallic iron, phosphorus, carbon, sulphur, and silicon which they contain; the most important being metallic iron and phosphorus. A merchantable ore is one carrying 50 to 65 per cent. of metallic iron, and *no phosphorus*, or merely a trace of the latter. These ores can be sold by the "unit," a "unit" being simply a per cent. For instance, 50 per cent. ore, at eight cents per unit, would be worth \$4.00 per ton of 2,240 pounds; at eight and a half cents per unit, the value would be \$4.25, and so on. If the ore should analyse below 50 per cent., a reduction in value of course would occur, but the buyer would not be bound to receive the ore at all, should the analysis fall below say 45 per cent. metallic iron. This is the practice in the United States, where in most cases the ores have to be carried long distances. In England and on the continent of Europe, where the ores have not to be carried so far, a considerable portion used do not contain over 30 per cent of metallic iron. These ores are found in connection with coal, and the exceedingly low prices at which they can be sold, makes up for the small amount of iron they contain.

Mr. I. Lowthian Bell in his recent work, "Principles of the manufacture of Iron and Steel," works out the average yield of native ores in the United States as being 58.25 of metallic iron in the year 1882, and, calculated in the same way, the average yield of British ores was 36.01 per cent, and of imported ores into Britain 52 per cent.

The price of iron ores varies generally with the state of the iron trade and fluctuates very considerably.

In some countries the ores and all minerals belong to the crown, and in others to the individual owners of the soil. In Canada both systems occur, some of the provinces legislating one way and some in the other.

Fuels.—In all the different processes in the manufacture of iron

and steel, great heat is required, so that the question of fuel is a very important one. Charcoal made from wood, bituminous coal, both raw and coked, and anthracite coals, are the fuels employed. In Sweden gases produced from peat, sawdust and refuse wood, slabs, &c., are used. It is as important that the fuels used should be pure, as that the ores should be, and when coal contains a large percentage of sulphur for instance, it is unfit for this purpose; a large percentage of ash is also very bad.

The reason of this will readily be seen on examining the method of making pig iron. In this process, the blast furnace may be roughly described as an upright cylinder. The *solids*, iron ore, coal or coke &c., are put in at the top, and come out, at the bottom, *liquids*, in the shape of molten iron and slag, the latter being *everything* that is left, after the metallic iron is extracted from the ores, apart from the gases which, by the combustion and the artificial blast, are generated and given off, and which weigh from five to seven tons, per ton of iron made.

Fluxes.—In order to promote the fusibility of the ores, a flux is added. Limestone is very generally used for this purpose, but it of course depends upon the chemical composition of the ores as to what substance will act as a flux. The enormous weights and quantities of materials used in smelting iron necessitate the use of some substance which can be procured cheaply and in very large quantities, and limestone is generally obtainable.

If the ores are "lean," that is, are not rich in metallic iron, and the fuel has a large percentage of ash, it follows that it takes more fuel to melt and liquify the minerals, and consequently costs more than if this was not the case, and now, in the most approved practice, the ores, before being used, are often washed, and still more frequently roasted, and the coal, which is usually made into coke, is often crushed and washed before being coked; the objects in both cases being to purify the materials and get rid of all superfluous matter. It is most important that the fuel should be hard and strong so as to resist the enormous weight it has to sustain, some blast furnaces being capable of holding 1,000 tons of material.

The product of iron ores may be broadly separated into three classes of materials, viz :—

Pig or Cast Iron,
Bar, Wrought or Rolled Iron,
And Steel.

Each of these may be subdivided into various branches, but, in this outline, we may not, and do not, aim at giving of these more than a very general idea.

Chemically pure iron is not made, and would not be fit for use; but it is in combination with very small and varying proportions of carbon, and almost infinitesimal proportions of other elementary substances, such as sulphur, silicon, phosphorus, manganese, &c., that the various qualities of cast and wrought iron and steel are made.

The principal differences in the production of these three materials and their use and composition may be briefly stated as follows:—

PIG OR CAST IRON is “the product of the treatment of iron ores, with fuel and fluxes in the blast furnace,” if, when molten and liquid, the iron is tapped out and run into open moulds or gutters in the sand (the feeding gutter being the “Sow” and the branches the “Pigs”), when solidified and cooled, it becomes the “Pig Iron” of commerce. All foundries use pig iron, which, when re-melted, can be cast into innumerable shapes, such as stoves, pots, pans, kettles, gas, water, soil pipe, &c.

Cast Iron contains from 2.00 to 4.75 per cent. of carbon: when broken, shows a *crystalline* fracture, is hard, generally brittle, fusible at a high temperature, but neither *malleable* nor capable of being *welded* at any temperature.

Cast Iron Scrap, when melted in the foundry cupola furnace, with a certain proportion of new pig iron, is suitable for a great many purposes.

COMMERCIAL CLASSIFICATION OF PIG IRON.

“It is usual to distinguish the various qualities of pig iron as delivered from the blast furnace by different marks or numbers, which indicate to the forge or foundry manager the grade or quality of the iron of any particular brand, as also the purpose to which the several samples are applicable. The pig iron produced from the same ores is broadly described as grey, mottled, or white iron, according to the appearance of the fracture, but each variety is again classified.”¹

Scotch pig is graded No. 1, 2, 3, 4 foundry, No. 4 forge, mottled, white, in all seven grades.

Cleveland or Middlesborough pig, in addition to these seven, has three others, viz., Refined metal, kentledge, and cinder. Kentledge being iron cast in slabs for ship-ballast.

¹ Steel and Iron. Greenwood, 1884, p. 75.

In other parts of England the nomenclature varies; if the iron is suitable for the manufacture of steel, it is called Hematite or Bessemer pig.

Charcoal Pig Iron, is made when charcoal is used as fuel, instead of coal or coke. In Canada it is chiefly used in the manufacture of car wheels.

BAR, WROUGHT, OR ROLLED IRON can be produced in two ways, either by the *direct* treatment of certain ores in a forge fire, or bloomary furnace, or *indirectly* by the lining and puddling of pig or cast iron in a puddling furnace. The former method is used to a small extent, with charcoal as fuel; it was the earliest way of making iron, and is still continued in the production of the finest qualities of iron for making cast steel, but the consumption of fuel is extravagant and the product costly. The bar iron of commerce is made by puddling cast iron, the first product being "puddled bars" or "muck bars" which, when re-heated and worked, are finished by being passed through rolls and converted into various shapes. Blacksmiths use wrought iron, which is forged and hammered into horse shoes, anchors, chains, bolts, nuts, spikes, nails, plates, sheets, forgings, &c.

Bar or wrought iron contains from only traces to 0.25 per cent. of carbon; when broken shows a *fibrous* fracture, is tough, and malleable when red hot, and is capable of being *welded* at a high temperature.

Wrought Iron Scrap can be re-worked by being cut up into convenient sized pieces, heated and then rolled or hammered. Old iron rails have supplied a large quantity of scrap in Canada.

The trade in Wrought (sometimes called Malleable) Iron may be sub-divided into the following classes: PUDDLED BARS, MERCHANT BARS, PLATES, SHEETS, HOOPS, and SECTIONAL IRONS, such as ANGLE IRONS, TEE IRONS, BEAMS or JOISTS, and numerous other forms or shapes, rolled for special purposes.

"The current rates for wrought iron are based upon certain accustomed conditions as to shape, dimensions, and weight of each piece. If anything outside or different from these conditions is required by the purchaser, extra prices are charged, which in some cases bear a high proportion to the nominal cost of the iron, and indeed in some cases the profit of the maker lies in these "extras." ¹

STEEL is produced in several ways, sometimes directly from the ore, more frequently from cast iron, and also from wrought iron; its exact composition and qualities are not easily defined, there being so

¹ "Matheson's Aid Book." London, 1881, p. 136.

many varieties. It may be said to consist of very pure iron with varying percentages of carbon of from 0.1 to 1.25 per cent. It can be made to weld or not, to harden or not, if plunged when red hot into water or oil. It can be cast, or it can be rolled, and recent processes of manufacture have reduced the cost of production to such an extent that in a great variety of ways it is taking the place of both cast, and also wrought iron.

Scrap Steel, to be utilized, has usually to be re-melted, cast into ingots and rolled; some is, however, imported of the right dimensions to roll at once into a finished article without any additional cost, except shearing to length.

"Steel has three main qualities which distinguish it from iron—(1) Its superior strength; (2) its durability or resistance to wear or abrasion; and (3) its capacity for being tempered, although for this purpose the mild steel used in structures is not suitable. It is its strength which renders steel suitable for structures (ships, bridges, roofs, &c.); its strength and resistance to wear which adapt it for boilers and machinery; its durability against abrasion, which makes it so valuable for rails, railway-points, wheel-tires, and toothed wheels; and its highest quality—the capacity for being tempered—which distinguishes it from all other materials, as alone suitable for cutting-tools and springs. So widely different are the old and new processes by which steel is made, and so subtle and minute the causes which produce wide differences of quality, that even the name itself *Steel* has become a subject-matter for dispute, and one in which no authoritative standard or definition has been agreed upon."¹

¹ "Matheson's Aid to Purchase." London, 1881, p. 150.

CHAPTER VII.

IMPROVEMENTS IN THE PROCESSES OF MANUFACTURE, &c.

An outline of the improvements in the manufacture of iron may be briefly given as follows. The history of the iron trade in Great Britain may be called the history of the iron trade of the world, till within a few years past:—

Up to the year 1733, charcoal was the only fuel in use, but about that time Abraham Darby succeeded in using charred coal or coke in his furnaces in England. Attempts had been made by other people previously, but without success. In the year 1740, there were only *fifty-nine furnaces* in England and Wales, and their *total annual product* was only 17,350 tons, or an annual average for each furnace of 294 tons, one cwt., one quarter, and 30,000 tons of iron were imported in that year for home consumption. Quoting from Mr. Bell, in his work on Manufacture of Iron and Steel, from the "Historical Section," p. 14, he continues:—

"The march of improvement seems to have been but languid, for with the aid of the steam engine and the substitution of iron cylinders for leathern bellows, the average weekly make in 1788 of the eighty-five furnaces in the kingdom was scarcely 15½ tons per furnace. Of the total annual quantity produced—viz., 68,300 tons—about four-fifths was smelted with coke and the remainder with charcoal.

"Such were the insignificant proportions of a trade, now so vast, when, about the year 1784, another inventor, Henry Cort, rendered as important service to the manufacture of malleable iron as Abraham Darby had afforded to the smelting of the ore. To his ingenuity we owe the grooved rolls and the puddling process of iron works, and it is no exaggeration to say, that to these two inventions we are mainly indebted for those changes which separate so sharply the last forty or fifty years from the world's previous social history. With no better implements than the hearth and the forge hammer, as they are used to this day in Sweden, it would have been practically impossible to produce a railway bar (rail), or a ship plate; and who can set

a limit to the aid these two articles have afforded to the unprecedented strides which have been made during the period referred to?"

Within seven years of the introduction of Cort's inventions, "50,000 tons of pig iron were annually converted"¹ by his processes.

In 1816 Samuel Baldwin made a very important improvement in the puddling furnace, "by substituting for the sand bottom of Cort's, one of iron, protected by a coating of oxide of iron. This "added greatly to the durability of the furnace as well as to the quality of the product."²

In 1828, James Beaumont Neilson invented the "hot blast." Up to this time the air necessary for the combustion of the fuel had been forced or blown into the furnace, cold. "Within four years of the introduction of the hot blast, the furnaces at the Clyde Works, in Scotland, were running more than double their former make, without requiring more fuel for the larger than for the smaller quantity. In other words the consumption of fuel per ton of iron, when burnt with air heated to 600 degrees Farenheit, was less than one half of what it was when using the blast at atmospheric temperatures."³

"The introduction of the hot blast was at the time of such immense value as to constitute undoubtedly one of the most marked epochs in the advancement of the iron trade."⁴

"In 1855 Sir Henry Bessemer invented a process which bears his name, and which revolutionised the malleable iron trade, as by this process steel could be produced more cheaply than malleable iron."⁵

"In Sir Henry Bessemer's ingeniously contrived apparatus, the circumstances connected with the evolution of heat are greatly modified, by pouring a vast volume of air very quickly through the molten iron. The combustion of the carbon and silicon becomes so rapid that the temperature of the mass rises to a pitch of intensity sufficient to maintain even malleable iron in a perfectly liquid state."

"The violent heat in the Bessemer converter depends, as we have seen, on the oxidation or combustion of the silicon and carbon in the original pig. This fact, therefore, necessarily limits the use of this process to iron containing a sufficient quantity of these two elements, or of some suitable substitute, the burning of which serves to melt the steel. If a system of producing steel is to be pursued, in which from the nature of the materials employed it is impossible to generate the heat in the manner of the Bessemer converter, then the use of

¹ Bell, p. 15.

² Bell, p. 15.

³ Bell, p. 17.

⁴ Bell, p. 19.

⁵ Bell, p. 29.

ordinary fuel becomes unavoidable. In the reverberatory furnace, as it is commonly constructed, there would be very great difficulty in maintaining a steady temperature of the proper intensity."¹

"These difficulties are admirably met in the 'regenerative furnace' of Messrs. Siemens. The fuel is employed in a gaseous condition, and the heat that would otherwise escape is imparted to the incoming air and gas, by which means the interior of the structure and its contents are raised to a temperature capable of maintaining any quantity of steel or even of wrought iron in a state of perfect fusion,"²

"During the thirty-five years or thereabouts, which followed the application of heated air to the smelting of iron, little or no improvement was effected in the construction of the necessary appliances."³

"The next, however, and a very important one it proved to be, is due to a Frenchman, M. Fabre Dufur. He was the first to utilise the vast volume of flame which flashed from the throats of our older blast furnaces, lighting up the sky and the country for miles round the great centres of their operations."

The gas was used for raising steam and heating the blast, and effected a very great economy in this way. "The higher and more regular temperature maintained in the blast, is the cause of a notable saving of coke in the furnace, and in the matter of labor it has been found that in an establishment of twelve furnaces it saves the work of thirty men or more, who were formerly engaged in coaling the fires of the blowing engine and hot air stoves."⁴

"Hitherto the limit to which the blast had been heated was that imposed by the power of the iron pipes to resist the action of the fire. This impediment was removed by Mr. E. A. Cowper's proposal to adopt the regenerative principle of Messrs. Siemens, in which brick work was raised to a high temperature, and the heat thus stored up was then conveyed into the furnace by passing the air over the hot surface of the bricks."⁵

"It will be useful at this place to glance at the effect produced by the various improvements in iron smelting referred to. For this purpose I have extracted from different sources an approximate statement of the weekly make of a blast furnace in 1835, 1845, 1855 and 1865, together with the quantity of coal reckoned in its raw state, required to make a ton of iron.

¹ Bell, p. 20.

² Bell, p. 21.

³ Bell, p. 21.

⁴ Bell, p. 23.

⁵ Bell, p. 24.

				Tons. Weekly Make.	Coal per Ton of Iron. Cwts.
1835.	Height 40 to 50 feet, capacity 5,000 cubic feet.	Blast, cold		70	120
1845.	ditto, ditto, ditto.	Blast at 650° F.		120	85
1855.	ditto, ditto, ditto.	Blast at 800° F., and using the escaping gases for steam and hot air.		320	62
1865.	Height 80 feet, capacity 20,000 cub. ft.	Blast at 1,000° F., 450 to 550			40

In all these examples, the mineral under treatment is supposed to be ordinary clay iron stone, yielding about forty-two per cent. of iron in its calcined state. When mineral of a richer description and more quickly reduced is employed, such as the magnetic ore of the United States, as much as 1,200 tons has been run in one week from furnaces containing only about 10,000 cubic feet.¹

English manufacturers of pig iron have exceptional advantages, apart from their immense market, cheapness of production (owing to the short distance of carriage to bring the ore, fuel and fluxes together) and low wages. The exceptional advantages spoken of being specially : the low rate of interest which is current, the custom of selling pig iron on "warrants," and the low freight rates which are always obtainable for export.

In the same way that the hog * may be regarded as "a concentrated form of corn," pig iron may be looked upon as concentrated coal, iron ore and limestone, about five tons of mineral making one ton of iron, and as these minerals have to be dug out of the ground, it could be proved that over 80 per cent. of the value of pig iron (and 90 per cent. of bar iron) goes for wages. This practically means that cash is required to pay these wages, and that, unless a ready sale is found for the iron, an immense investment speedily ensues, as a blast furnace when once started cannot be stopped without serious consequences. The custom of the trade is to give six months credit on the purchase of pig iron, and the rate of interest being low in England, they can better afford to do this than where the rate is

¹ Bell, p. 25.

"And now, my esteemed friends, let us make a slight descent, let us talk about hogs, "and the glorious west as a gigantic hog pen. I must really beg you not to laugh, for I "am profoundly serious, and do assure you that the hog is a very praiseworthy, interesting "and important animal. For how, let me beg to ask, could you possibly, without his "benevolent and efficient aid and co-operation, bring down the whole of these five "hundred millions of bushels of grain to the sea? How could such a mountain mass of "cereals, and especially of Indian corn, ever be sold, or disposed of? But thanks to the "ingenuity of man, and the necessity of the case, the process has been found. The crop "is condensed and reduced in bulk by feeding it into an animal form more portable. "The hog eats the corn, and Europe eats the hog. Corn thus becomes incarnate, for what "is a hog but fifteen or twenty bushels of corn on four legs." Speech of Mr. S. B. Ruggles, of New York, at the Canal Convention of Chicago, June, 1863. Report 49.

Extract from "Canadian Canals," by William Kingsford, Toronto, 1865, p. 147.

higher, as it always is in a new country, but this advantage is small compared with the system in operation in the three largest iron centres in Great Britain, viz., that of selling on *warrants*.

In the market reports, in most daily newspapers, "warrants" are quoted by cable reports, and the initials G. M. B. are often to be seen in connection with the prices.

In Glasgow, Middlesborough and Workington there are official stores for the reception of pig iron, where it is examined and received, if up to the ordinary standards. Warrants are then issued, each warrant represents 500 tons, of which three-fifths are for No. 1 pig, and two-fifths for No. 2 pig. This is the Glasgow practice. These warrants are negotiable documents and are indeed the chief medium of speculation, as well as of legitimate buying and selling on the Glasgow exchange. The letters G. M. B. stand for "Good Merchantable Brands." The iron the warrants represent is quoted at so much per ton on the market, and a buyer may purchase any quantity—not necessarily the full amount represented by the warrant.

The custom seems to be for the Iron-masters to deliver free into the store on the same terms as free on board (f. o. b.) The charge made at the stores for "piling, weighing, loading into trucks, unloading, re-weighing, and putting f. o. b. in dock or on railway siding, is 25 cents per ton, (an additional charge for cartage of 12 cents is made in Glasgow), which is payable when the iron is taken into store. The charge for rent is one cent per fortnight or two cents per month, or fraction of the term. The charge for registration of transfer is about 25 cents per 100 tons, or fraction of this quantity.¹

This custom enables makers to continue operations, and to have at all times a way of securing advances on their iron, without of necessity having the capital to carry it, or of straining their credit to obtain funds.

In the United States, the same system is in operation in two or three places on a small scale,—that is, where iron may be stored and warehouse receipts or certificates obtained—but the trade is carried on in a different way, and it has not been found a necessity.

The amount of pig iron held by makers and in store in Great Britain at the end of 1882 was about *one million eight hundred thousand tons*.

Freight Rates.—The question of freight rates on an article of such

¹ Grading and warehousing iron in Great Britain, by James C. Bayles. Journal of the United States Association of Charcoal Iron Workers, vol. v., p. 303.

weight as iron, is of such importance that it often decides if it is possible to carry on the manufacture or not. England is particularly well situated, as owing to her immense commercial marine, and her enormous imports of produce, outgoing rates are very often nominal. As an instance, the quoted rates for the past twelve months, by cable from London to the "Iron Age" on steam freights from Glasgow to New York, are as follows :—

1884	PER TON.		£ = \$486	
	s. d.	s. d.	Cts.	Cts.
January 2.....		4 0		0.96
" 9.....		3 6		0.85
" 23 and 30.....	4 6	5 0	1.09	1.21
February 6 and 20.....	4 6	5 0	1.09	1.21
" 27.....	7 0	7 6	1.70	1.82
March 5.....	6 6	7 6	1.58	1.82
" 12 and 26.....	6 0	6 6	1.46	1.58
April 2.....	6 0	6 6	1.46	1.58
" 9, 16, 23.....		5 0		1.21
May 7, 14, 21.....		4 6		1.09
June 4.....	3 0	3 6	0.73	0.85
" 11.....		6 6		1.58
" 18.....		3 0		0.73
July 29, 16 and 30.....	3 6	4 0	0.85	0.97
August 6.....	3 6	4 0	0.85	0.97
" 13 and 27.....		3 0		0.73
September 3, 10, 17 and 24.....	2 6	3 0	0.60	0.73
October 1, 8, 22 and 29.....	2 6	3 0	0.60	0.73
November 5, 12 and 25.....	2 6	3 0	0.60	0.73
December 3, 10, 17 and 30.....		1 6		0.36½
1885.				
January 7, 14 and 28.....		1 6		0.36½
February 4.....		1 6		0.36½

Mr. Bell in his work, *Manufacture of Iron and Steel*, in Section XVIII, Chief Iron-Producing Countries Compared, p. 604, says :—

"Some twenty years ago very large quantities of iron were imported into the United States, almost exclusively from Great Britain. At this time the total value of the imports and exports, exclusive of the precious metals, from and to the Union, nearly balanced each other in point of value; for in 1865 the former were £21,624,125, against £25,170,787. From the year 1865 to the end of 1869, the average annual freight on pig iron from England to New York varied from \$4.94 to \$5.87, of itself a very effective protective duty to the American iron-masters. In the year 1870 the balance of trade had already shown signs of considerable change, and with it the protection afforded by

high freights began to diminish. The following table compiled from the figures given in the "Financial Almanac" from the reports of the American Iron and Steel Association, and from information kindly supplied to me by the Inman Steam Navigation Company, is instructive on the question before us :—

Value of imports and exports into and from the United Kingdom, from and to the United States, exclusive of bullion and specie, together with the rates of freight on pig iron from England, and other particulars.

	1870	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
	£	£	£	£	£	£	£	£	£	£	£
Imports from U. S. in thousands of pounds...	49,804	51,661	71,471	73,897	69,390	75,899	77,825	89,116	91,818	107,081	103,267
Exports into the U. S. in thousands.....	31,306	45,907	36,698	32,238	25,062	20,062	19,885	17,591	25,818	37,954	36,783
£ \$4.86.											
Freight average on Pig.	1.62	3.89	3.83	1.56	1.03	0.42	0.73	0.60	1.09	1.43	1.70
Imports into U. S. of Iron and Steel in thousands of net tons.....	916	1,325	717	357	268	228	236	236	862	2,112	1,922

It will thus be perceived that, in the year 1876, the weight of iron and steel imported into the United States was almost exactly one-sixth of that in 1872. At the same time the value of all exports sent out of the United States to the United Kingdom had increased about forty per cent., while that of merchandise going in the other direction had fallen off to the extent of 44 per cent. This of course meant a greatly diminished weight of material to be transported to America, against a great increase in that coming from America to this country. (England.) Pig iron under such a state of things was considered as ballast, and the British iron-masters instead of paying \$5.87 freight as they did in 1867, were only charged 42 cents in 1876. In other words the American iron-masters lost \$5.45 per ton of the natural protection afforded to them by the cost of transporting British pig iron to New York."

"Now it is needless to say that such rates of freight as were paid on pig iron in 1877 and 1878, viz., 73 cents and 60 cents, involve so far as the actual expenses of navigation from the British Isles to New York are concerned, a very great loss to the ship-owner, which loss is reimbursed by an increased charge for transport on the return cargo.

To show how this operates, I have compared two years, viz., 1877, when the freight on pig iron averaged 73 cents from Liverpool and Glasgow, with 1881, when it was \$2.80 from the former port, and \$2.19 from the latter.

Average Freight from New York to Liverpool for the year 1877 and 1881:—

	Grain per bush. 60 lbs.	Cotton per lb.	Cheese per ton.	Bacon per ton.
1877	\$12 74	\$0 52	\$9 89	\$7 46
1881	8 56	38	5 77	4 76
	Per cent.	Per cent.	Per cent.	Per cent.
Decrease of 1881 compared with 1877.	48½	40	7½	56

The increased costs of transport of course come out of the pockets of the agricultural population of the United States.”¹

A considerable quantity of pig iron is annually brought out on “ship’s account,” as ballast, and sold at any price it will bring.

¹ Bell, p. 607.

CHAPTER VIII.

HOW OTHER COUNTRIES HAVE FOSTERED THE INDUSTRY.

Beginning with Great Britain, we will first see how she protected herself, and then note the result.

The following are extracts from "Scrivenor's History of the Iron Trade," a standard authority on the subject.¹

The first legislation was made in the fourteenth century. "By an act passed in the 28th year of Edward the Third, no iron manufactured in England, and also no iron imported and sold, could be carried out of the country, under penalty of forfeiting double to the King: and the magistrates were empowered to regulate the selling price and to punish those who sold at too dear a rate, according to the extent of the transaction."² Iron was a very scarce article at that time.

"During the 14th and 15th centuries, iron and steel were imported from Germany, Prussia and other places, and also iron from Spain. But as several improvements had taken place in the course of this period in England, laws were made towards the end of it against importing any of the articles manufactured in this country in iron or steel. Upon a petition to the House of Commons, A.D., 1483, from the manufacturers of London and other towns, representing the great damage they had sustained by the importation of the articles which they manufactured, an Act was passed against the importation of knives, hangers, tailor's shears, scissors and irons, fire forks, gridirons, stock locks, keys, hinges and garnets, spurs, bits, stirrups, buckles, chains, latten nails with iron shanks, buckles for shoes, shears, iron wire, iron candlesticks, grates, and other articles of home manufacture."

All iron was at this time made with charcoal as fuel, and this continued till the year 1740, by which time the forests had been so thinned that acts were passed prohibiting the erection of any more iron works, and that timber should not be felled in certain counties "to make coals for burning iron."

¹ A Comprehensive History of the Iron Trade by Harry Scrivenor, Blaenavon, London, 1841.

² p. 32.

"Recourse was had to foreign markets for the necessary supply of manufactured iron as each year witnessed an increased demand for the article, and the immense annual importations from Russia and Sweden may date their origin from this period. The 300 blast furnaces, were now diminished to fifty-nine, and their total annual product to 17,350 tons, or not quite 300 tons from each furnace."¹

"In the year 1750 an Act 23, George II, was passed for encouraging the importation of pig iron from the British Colonies in America. The Act, however, contained the following clause: That from and after the 24th day of June, 1750, no mill or other engine for slitting or rolling of iron, or any plating forge, to work with a tilt hammer, or any furnace for making steel, shall be erected, or, after such erection, continued in any of his Majesty's colonies of America."² This precaution being taken that the colonies might not interfere with the manufacturers of the mother country.

The English iron trade may be said to have commenced with the substitution of pit coal, as it was called, for charcoal, the invention of the steam engine and blowing engines of improved form. In 1788 the number of blast furnaces in England and Wales was seventy-four using charcoal, averaging each 294 tons per year, and fifty-three furnaces using coke, averaging 909 tons each per annum, and the total product of all the furnaces in England, Wales and Scotland was 58,300 tons.

"In 1785 the manufactures in iron and steel being objects of great importance, the exportation of any tools or engines used in them, or models or plans of such, was prohibited, under the penalty of one years imprisonment, and a fine of £200, besides forfeiture of all the articles shipped or proved to have been intended to be shipped. The same fine was also inflicted upon the commander of any vessel, knowingly receiving any such articles on board, and on custom house officers permitting them to be shipped; such officers and also commanders of the King's ships so offending, being, moreover, rendered forever incapable of holding any office under his Majesty; but the importation of the artificers themselves is more strictly prohibited. Any one enticing or endeavouring to entice any one who has wrought in the iron and steel manufacture to go to a foreign country, is liable to one years imprisonment and a penalty of £500, for every person he has enticed or endeavoured to entice; and in case of committing the

¹ p. 56.² p. 73.

offence a second time, the imprisonment and fine are to be doubled." (25 Geo. III, c. 67.)¹

In addition to this prohibition, the following customs duty were levied :—²

The duty on foreign bar iron was as follows :—

	PER TON.
From 1782 to 1795.....	\$13.65
1796.....	15.02
1797.....	15.71
From 1798 to 1802.....	18.35
1803.....	20.52
1804.....	21.49
1805.....	24.57
From 1806 to 1808.....	26.15
" 1809 to 1812.....	26.72
" 1813 to 1818.....	31.59
" 1819 to 1825.....	31.63
If imported in British ships and if imported in foreign ships.....	38.56

In 1826 the General Customs Act of the 6th George IV, c. 3, which took effect on 5th January, 1826, provided for the reduction of duties as follows :—³

IRON, VIZ :	OLD DUTY.	NEW DUTY.
In bars or unwrought, the produce of any British possession and imported from thence, <i>per ton</i>	\$5.39	\$0.60
In bars or unwrought, the produce of any other country, <i>per ton</i>	31.63	7.30
Slit or hammered into rods, and iron drawn or hammered less than $\frac{3}{4}$ of an inch square, <i>per ton</i>	97.33	6.08
Cast, for every \$486.66 of value.....	97.33	48.66
Old broken, and old Cast Iron, <i>per ton</i>	4.25	2.92
Ore, <i>per ton</i>	2.13	1.21
Pig, <i>per ton</i>	4.25	2.43
Pig, the produce of and imported from any British possession in North America, <i>per ton</i>	1.95	30
Wrought, not otherwise enumerated or described, for every \$486.66 of value.....	243.33	97.33
Wire, not otherwise enumerated or described, <i>per ton</i>	577.92	97.33
Hoops, <i>per ton</i>	115.58	115.58
Steel or any manufacture of steel not otherwise enumerated or described, for every \$486.66 of value, without discrimination of ships.....	243.33	97.33

In 1848 England "embraced, without consultation with other powers, what is known as the Principles of Free Trade. We did this in our own interests, believing it is true, that we were at the same time promoting those of the world at large. We continue in this

¹ p. 356.

² p. 127.

³ p. 130.

course, because we rely on the soundness of the policy itself, and we must leave those with whom we deal to be their own judges of what suits them best, whether we agree with them or not."¹

A remnant of the spirit of protection is, however, occasionally met with, as the following instance will prove: The India office, in their specification of material, for iron work of bridges for Indian State railways, in their contracts in 1883, specify that "no iron of foreign manufacture is to be used throughout the contract."²

The result of the system of protection to home manufacturers will be best shown by the production. At the time free trade was adopted, England was making nearly one-half of all the pig iron made in the world.

TOTAL ANNUAL PRODUCTION.

	Tons.
1740.....	17,350
1788.....	68,300
1796.....	125,079
1806.....	258,206
1823.....	425,066
1825.....	581,367
1830.....	678,417
1840 ³	1,396,400
1852 ⁴	2,701,000
1860.....	3,826,752
1870.....	5,963,515
1880.....	7,749,233
1882.....	8,586,680

This last amount of pig iron, over eight and half million tons, took to make it over *seventeen and three quarter million tons of coal*, and over *twenty-one million⁵ tons of iron ore* were raised and imported into the United Kingdom in 1882.

The following tabulated statement of the production of pig iron in Great Britain gives some valuable information. The table is from Mineral Statistics of Great Britain, the two columns on the right having been added by Mr. Bell.—⁶

¹ Bell, p. 446.

² Last section of clause 2 of specification.

³ Swank, p. 45. ⁴ Fossick.

⁵ Mineral Statistics of U. K., 1882.

⁶ p. 622.

Summary of the Production of Pig iron in Great Britain, in the year 1882, and of the coal used (including coal converted into coke) in its manufacture.

	Number of Furnaces.		Pig Iron Made.	Coal Used.	Yearly Make per Furnace.	Coal per ton of Pig.
	In Blast.	Out of Blast.	Tons.	Tons.	Tons.	Cwts.
ENGLAND AND WALES.						
Cumberland.....	45	10	1,001,181	1,826,393	22,249	36.48
Denbighshire and Flintshire...	6	4	53,138	154,888	8,856	58.30
Derbyshire.....	40	13	372,650	930,360	9,316	49.93
Durham.....	34	36	815,671	1,634,984	23,950	40.08
Glamorganshire.....	27	64	404,350	853,642	14,976	42.22
Gloucestershire, Hampshire, } Somersetshire and Wiltshire }	4½	8½	52,991	108,721	11,775	41.03
Lancashire.....	35	14	790,999	1,345,863	22,600	34.03
Lincolnshire.....	17	4	201,561	464,600	11,856	46.10
Monmouthshire.....	35	13	530,084	991,969	15,145	37.42
Northamptonshire.....	15	11	182,115	445,300	12,807	46.35
Northumberland.....	4	3	93,422	143,237	23,355	30.66
Nottinghamshire.....	5	—	73,085	182,206	14,617	49.86
Shropshire.....	10	14	80,475	240,000	8,047	59.64
Staffordshire, North.....	25	12	275,577	542,572	11,023	39.38
Staffordshire, South.....	31½	61½	247,667	558,966	7,862	45.14
Worcestershire.....	16	24	150,776	399,416	9,423	52.98
Yorkshire, North.....	82	9	1,803,508	3,694,857	21,994	40.97
Yorkshire, West.....	28½	18½	321,430	726,482	11,377	45.20
Total England and Wales..	460½	317½	7,460,680	15,244,056	16,210	40.86
SCOTLAND.						
Ayrshire.....	28½	14½	350,423	731,004	12,295	41.72
Dundee, Lanarkshire & Stirlingshire.....	81½	24½	775,577	1,821,241	9,516	46.96
Total production of Great Britain.....	110	39	1,126,000	2,552,245	10,236	45.33
	570½	358½	8,586,680	17,796,301	15,058	41.45

*Value of ironstone and iron ore from mines and open workings in Great Britain and Ireland, in the year 1882 :—*¹

DISTRICTS.	Quantities.	Average per-centage of Metallic Iron.	Value of Ore at the Mine or Open Works.	Average Value per Ton.
Under Coal Mines Regulation Act, } England and Wales, stratified } Iron Stone.....	9,101,270	30%	\$9,577,743	\$1 05
Scotland Iron Stone.....	2,404,177	32½%	5,459,170	2 27
Under Metalliferous Mines Regula- } tion Act and from open workings }	6,526,510	.....	15,036,913	2 30
Total produce.....	18,031,957	36.01	\$28,087,325	\$1 56
IMPORTED ORES. ²				
Total tons.....	3,284,946	52.0	\$17,511,022	\$5 61

¹ Mineral Statistics, p. 53.

² p. 54.

The total quantities of ironstone and iron ore produced in the United Kingdom and imported in the year 1882 and nine previous years, were as follows :—¹

Year	UNITED KINGDOM.		FOREIGN ORES.		Total.
	From Coal Measures.	Ores not in Coal Measures.	Imported	Purple Ore.*	
1873	5,519,495	10,058,004	967,536	275,000	16,820,035
1874	5,454,722	9,390,214	754,141	255,000	15,854,077
1875	5,229,010	10,592,050	458,683	280,000	16,559,753
1876	5,059,423	11,182,160	672,235	300,000	17,813,818
1877	5,924,727	10,761,075	1,142,308	415,000	18,250,110
1878	5,405,777	10,320,593	1,173,411	400,000	17,299,781
1878	5,130,849	9,248,886	1,085,045	332,300	15,797,080
1880	5,398,528	12,627,881	2,632,601	427,730	21,086,740
1881	5,133,354	12,312,711	2,450,698	352,500	20,249,263
1882	5,179,133	12,852,824	3,384,946	408,000	21,724,903

Summary of pig iron made in Great Britain and of coal used (including coal converted into coke) in its manufacture, for the ten years ending 1882 :—¹

Year.	Pig Iron Made.	Coal Used.
1873.....	6,566,451	16,718,562
1874.....	5,991,408	15,292,201
1875.....	6,365,462	15,645,774
1876.....	6,555,997	15,598,381
1877.....	6,608,664	15,342,445
1878.....	6,381,051	14,112,005
1879.....	5,995,337	13,117,411
1880.....	7,749,233	16,982,629
1881.....	8,144,449	17,484,990
1882.....	8,586,680	17,796,301

Average price of pig iron at the works for the year 1882 (from the Coal and Iron Trades Review), from weekly prices :—

Cleveland No. 3. f.o.b. Tees.	N. Staffordshire Mine No. 1.	S. Staffordshire Mine No. 1.	West Coast Bes- semer No. 1.	Scotch No. 1
\$10.58	\$14.05	\$17.21	\$14.23	\$12.22

¹ Mineral Statistics, p. 55.

* From Imported Pyrites.

¹ Mineral Statistics, 1882, p. 64.

THE MANUFACTURE OF IRON IN THE UNITED STATES OF AMERICA.

The United States now rank second in the world's production of Iron and Steel.

The following table shows the growth of the Pig Iron industry by decades from 1810 :¹

Years.	Gross Tons.
1810.....	54,000
1820.....	20,000
1830.....	165,000
1840.....	315,000
1850.....	564,775
1860.....	821,223
1870.....	1,665,179
1880.....	3,835,191
1884.....	4,097,868

Charcoal was the only fuel in use till about the year 1840, when anthracite coal was tried in blast furnaces, and with success ; it is only about ten years since the production of iron with bituminous coal in the form of coke, caught up to the production of that made with anthracite, but it has rapidly increased since : the returns for 1885 show the following :

YEARS.	NET TONS OF 2000 POUNDS.			
	Anthracite.	Charcoal.	Bituminous.	Total.
1875.....	908,046	410,990	947,545	2,266,581
1876.....	794,578	308,649	990,009	2,093,236
1877.....	934,797	317,843	1,061,945	2,314,585
1878.....	1,092,870	293,399	1,191,092	2,577,361
1879.....	1,273,024	358,873	1,438,978	3,070,875
1880.....	1,807,651	537,558	1,950,205	4,295,414
1881.....	1,734,462	638,838	2,268,264	4,641,564
1882.....	2,042,138	697,906	2,438,078	5,178,122
1883.....	1,885,596	571,726	2,689,650	5,146,972
1884.....	1,586,453	458,418	2,544,742	4,589,613

Stat. Am. Iron and Steel Assoc. 1885, p. 26.

This change in the fuel has resulted in a marvelous development of the coke making industry.

The system of protection to home manufacturers, was adopted

¹ Annual Report of the American Iron and Steel Association, 1885, p. 40.

very early in the history of the country, and has resulted in the establishment of an enormous industry. In the appendix will be found tables, giving all particulars of the various acts and changes in the Customs tariff since the Union, relating to Iron and Steel.

Mr. Swank, in speaking of the manufacture of iron in the United States, under the head of Impediments to the Cheap Production of Iron and Steel in the United States, says :

"The Iron and Steel industries of the United States are subject to permanent disadvantages from which the same industries of other countries are in a great measure relieved. It is true that it cannot now be said, as it was once said, that they lack the skill, or the capital or the extensive and complete establishments of other countries. They are no longer infant industries in any sense. Nor can it be said that the natural resources for the manufacture of Iron and Steel in our country are not abundant and varied. But, in comparison with the iron and steel industries of other countries, they are at a disadvantage in two important particulars. The wages of labor are much higher in this country than in any other iron-making country in the world; and the raw materials of production, rich and abundant as they are, are in the main so remote from each other that a heavy cost for their transportation is incurred to which no other iron-making country is subjected."

"From the iron ore mines of Michigan and Minnesota to the coal of Pennsylvania is 1,000 miles. Connellsville coke is taken 600 miles to the blast furnaces of Chicago, and 750 miles to the blast furnaces of St. Louis. The average distance over which all the domestic iron ore, which is consumed in the blast furnaces of the United States is transported, is not less than 400 miles, and the average distance over which the fuel which is used to smelt it, is not less than 200 miles.¹

The following chart for the use of which I am indebted to the courtesy of the proprietors of *The Iron Trade Review*, of Cleveland, O., gives the prices and shipments of Lake Superior ore since 1857, together with the range of prices for hematite iron ores, the highest and lowest freight rates by lake each year from Marquette and Escabana for the past thirteen years, and on the following page will be found a diagram showing the lowest and highest prices of pig iron in Cleveland, Ohio, for the past thirteen years :

¹ The manufacture of Iron in all ages, by James M. Swank, p. 347.

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DIAGRAM S
LAKE S

Also the Range of Pri

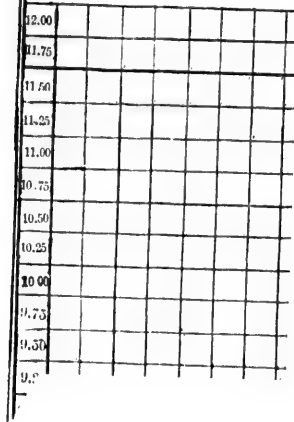
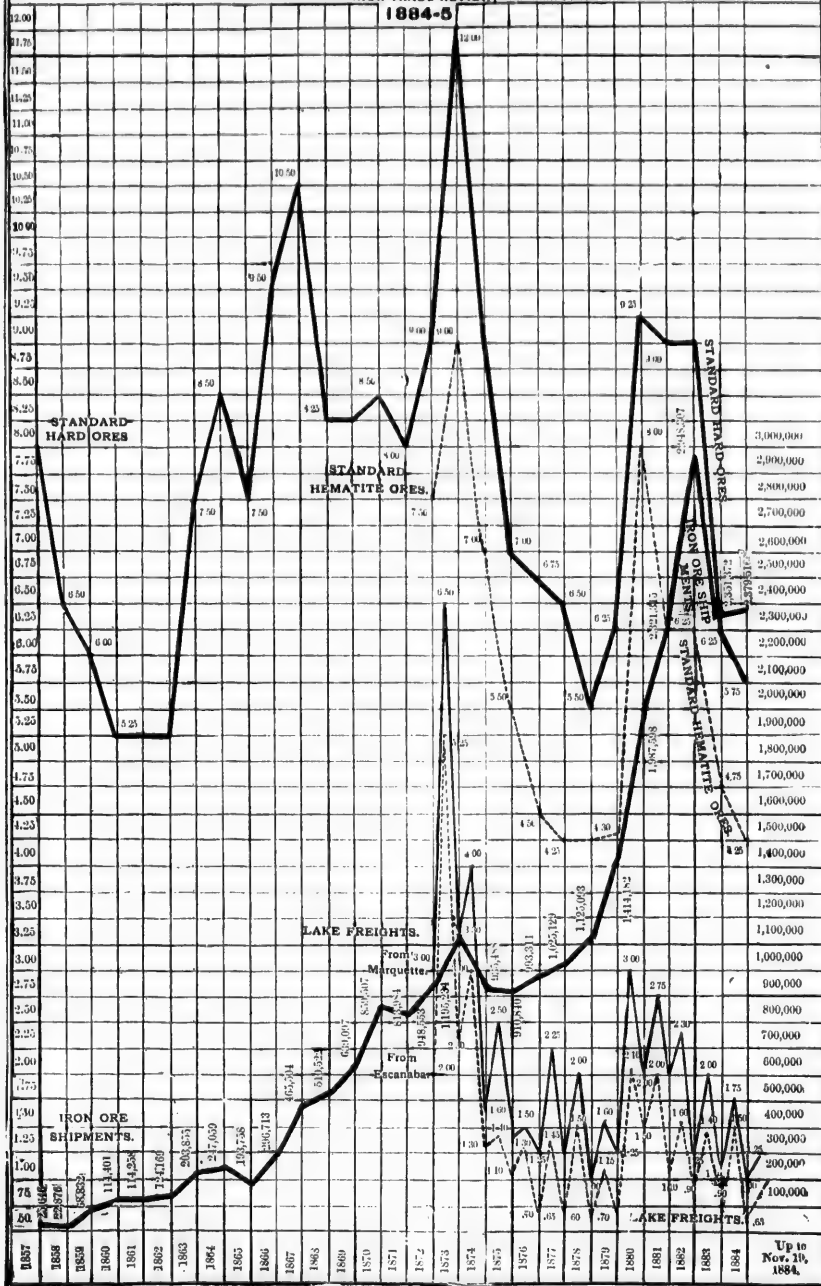
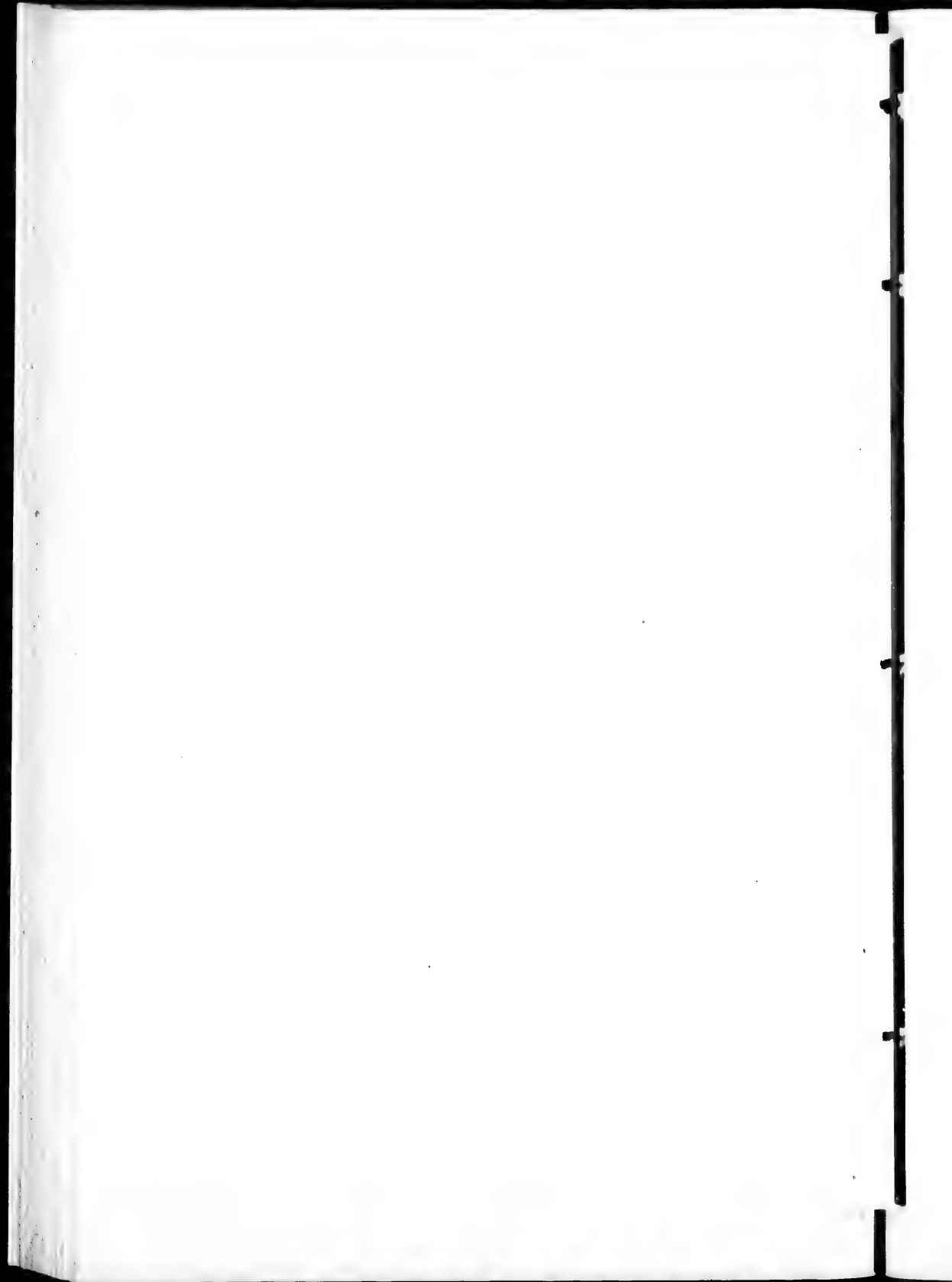


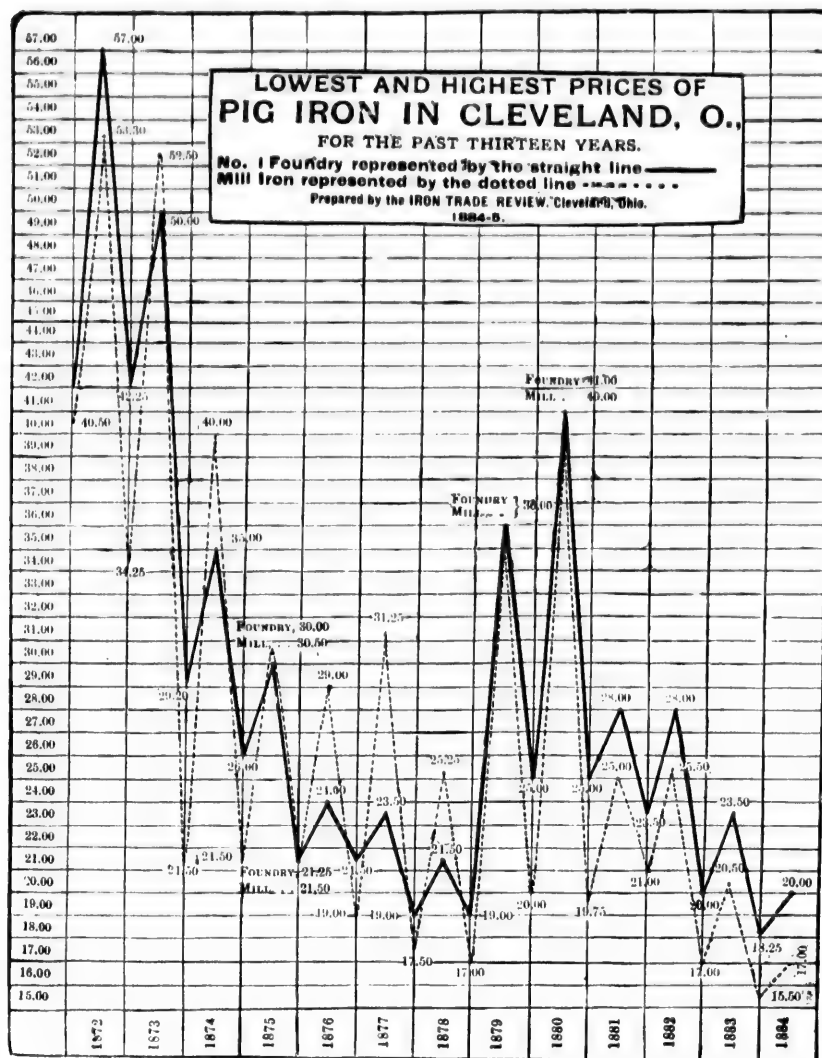
DIAGRAM SHOWING THE SHIPMENTS AND PRICES OF LAKE SUPERIOR IRON ORES,

FOR TWENTY-SEVEN YEARS
Also the Range of Prices for Hematites, and the Highest and Lowest Freight Rates by Lake
Each Year from Marquette and Escanaba
FOR THE PAST THIRTEEN YEARS
Based on the Cleveland Market.

PREPARED BY THE IRON TRADE REVIEW, CLEVELAND, O.





**STEEL RAILS.**

Methods of protection, apart from the Customs' tariff, may be shown in the means taken to encourage the manufacture of rails. It is well known that the construction of railways affords the largest outlet for the consumption of iron and steel. When large money and land subsidies have been granted to railways in the United States,

the Government has, in the cases of some of the most important lines, specified that the iron used should be of American manufacture.

"The Union Pacific Railway was chartered on the 1st of July, 1862, by the Congress of the United States, which granted to it the right of way over the public domain, 12,800 acres of the public lands per mile of road, and a subsidy in Government Bonds at the rate of \$16,000, \$32,000, and \$48,000 per mile of line, the object being to apportion the subsidy in ratio to the cost of the several sections. The amount of the subsidy for 1,033 miles was \$27,226,512. By the Act of Incorporation, the subsidy bonds were to be a first mortgage on the road. The road was opened May 10th, 1869."¹

The Act passed 37 Congress, Sess. II., ch. 120, 1862, and Sec. 4 specifies, that "*the rails and all the other iron used in the construction and equipment of said road to be American manufacture of the best quality.*"

The Northern Pacific Railway received a land grant of 20 sections to the mile (12,800 acres) within the States, and 40 sections (25,600 acres) to the mile within the Territories. Construction was commenced in 1869, and completed in 1883. Total length of main line and branches 2,070.51 miles. The Act of Incorporation was passed by 38 Congress, Sess. 1, ch. 217, 1864, and it says in Sec. 5, "And be it further enacted, that said Northern Pacific Railway shall be constructed in a substantial and workmanlike manner, with all the necessary draws, culverts, bridges, viaducts, crossings, turnouts, stations, and watering places, and all other appurtenances, including furniture and rolling stock, equal in all respects to railroads of the first-class, when prepared for business, *with rails of the best quality manufactured from American iron.*"

The Atlantic and Pacific Railway, by charter 39 Congress, Sess. 1, ch. 278, 1866, contained the same clause as just cited for the Northern Pacific Railway. "This Company was chartered July 27, 1868, for the purpose of constructing a railroad from the Western boundary of the State of Missouri to the Pacific Ocean, on what is known as the 25th parallel, a distance of about 2,000 miles. To aid in its construction, the Government of the United States made a grant of 12,800 acres of public lands to the mile in the United States, and 25,000 acres to the mile in the Territories. This land grant calls for 42,000,000 acres."—*Poor*, p. 868.

A still more stringent clause is inserted in the charter of the Texas Pacific Railway, which was granted in 1871, 41 Congress, Sess.

¹ "Poor's Railway Manual," 1884, p. 773.

III., ch. 122. Section 16 specifies "*That the said road shall be constructed of Iron or Steel rails manufactured from American ore.*" The length of this line is 1,487 miles.—*Poor*, p. 852.

The proviso that the rails shall be made out of American ore prevents their manufacture out of imported ore, or out of imported blooms, the previous clauses mentioned not covering these points.

The result of the American plan of Customs' duties and the foregoing stipulations will be seen in the following table which gives the "statistics of the annual production of Bessemer Steel Rails in the United States since the commencement of their manufacture, together with the annual price at which they have been sold and the rates of duty imposed on foreign rails. The yearly price has been obtained by averaging the monthly prices. *No better proof of the wisdom of our Protective policy is needed than is furnished by this table:*"¹

AVERAGE PRICE OF GOLD.	YEARS.	PRODUCT IN GROSS TONS.	PRICE IN CURRENCY.	DUTY.
			\$ c.	
138	1867	2,277	166.00	45 per cent. <i>ad valorem</i> .
140	1868	6,451	158.50	
136	1869	8,616	132.25	
115	1870	30,357	106.75	
112	1871	34,152	102.50	
112	1872	83,991	112.00	\$28.00 per ton to Aug. 1, 1872; \$25.20 to Mar. 3, 1875; \$28.00 from that date to July 1, 1883.
113	1873	115,192	120.50	
112	1874	129,414	94.25	
114	1875	259,699	68.75	
110	1876	368,269	59.25	
105	1877	385,865	45.50	
102	1878	491,427	42.25	
100	1879	610,682	48.25	
100	1880	852,196	67.50	
100	1881	1,187,770	61.13	
100	1882	1,284,067	48.50	From July 1, 1883, \$17.00.
100	1883	1,148,709	37.75	
100	1884	996,983	30.75	
100	1885 April	.....	26.00	

GERMANY.

Germany now ranks third in the world's production of pig iron, steel and coal. She has arrived at this position by protecting her home manufacturers, liberally at first and then gradually reducing the duties.

¹ Extract from Annual Report of the American Iron and Steel Association, May 15th, 1885, p. 35.

FRANCE.

"Towards the end of the last century, the French Government took active measures to become acquainted with the state of the mines, and also to introduce any improvements which would facilitate the working of them. Scientific men were sent to the most celebrated mines of Europe, and a Royal College of Miners was established, where distinguished *savants* taught gratuitously all the sciences connected with the sinking of mines. The young men admitted to the lecture had before them a collection of minerals, comprising the mineralogical history of the kingdom; and, to join practical to theoretical knowledge, indispensable to the miner, the pupils in the summer season devoted their time to the most important workings—pursuing their labours under able instructors."¹

By a system of state aid and protection to home industry, France has kept her home market to herself. Mr. Bell, in his statistical section, at page 467, gives a table showing the make and importations since the year 1866, and it appears "that at least 90 per cent. of all the iron used in France is of French make."

In 1860 the duty on pig iron was \$9.53, from which it was reduced, in 1864, to \$7.78, and finally, in the following year, to \$2.92 where it now remains.

The present duties are as follows:—Pig iron, \$2.92; bar iron, \$9.93; iron rails, \$9.93; iron plates, \$13.88; steel rails, \$11.85; steel plates, \$17.84. These figures are given by Mr. Bell.

BELGIUM.

The Iron Trade of Belgium may be said to have made a beginning about 1823, although the history of the trade dates back to the time of the Romans.

"Without touching upon remote periods, we will commence at the year 1822, when there was placed at the disposal of the King an annual sum of 1,000,000 florins (about \$50,000) for the encouragement of industry by premiums, loans, and other means. We shall not notice any of the minor instances of the useful application of this fund in the way of loans of capital, but shall mention the assistance afforded to Mr. Cockerill, an Englishman, on account of the more general effect which the encouragement given to him was intended to produce.

The first object was to improve the method of smelting and manu-

¹ Scrivenor, p. 181.

facturing iron in the mining districts ; for that purpose Mr. Cockerill had been invited by the king to settle in the neighborhood of Liege. He received a very large sum by way of loan, in order to assist him in the extension of his works,—coupled with a condition that the Iron-masters of Liege and Namurs should have the liberty to go there to learn the true principles and the latest improvements in the art. The unremitting industry of Mr. Cockerill formed a large establishment for machinery of every description—one of the most perfect establishments in all Europe. Belgium is now celebrated for its iron manufactures.”¹

The manufacture of iron and steel has steadily progressed since 1837. The following table shows the gradual development of the Bessemer steel industry in Belgium since its introduction :

STATISTICS OF BESEMER STEEL TRADE IN BELGIUM.

YEARS.	NO. OF WORKS.	CONVERTORS.	TOTAL PRODUCTION. TONS.	TRADE VALUE. £	AVERAGE PRICE PERTON. £
1864	1	1	296	7,072	20
1865	1	1	969	17,188	18
1866	1	1	1,460	23,360	16
1867	1	1	1,769	24,456	14
1868	1	1	2,509	31,814	13
1869	1	1	3,699	46,488	13
1870	1	2	5,977	74,499	12
1871	1	4	10,854	126,904	12
1872	1	4	14,985	204,576	14
1873	2	7	21,268	339,904	16
1874	2	10	36,584	461,498	13
1875	2	12	53,500	553,214	10
1876	2	12	71,758	592,730	8

With the exception of the product of three blast furnaces, the pig iron employed in the manufacture of steel mostly comes from England.²

Mr. Bell thus refers to Belgium in his statistical section :

“ It was recently stated in the public prints, that Belgium was outstripping us in economy of manufacture, because Cleveland pig iron was being converted in Belgium works into wrought-iron girders, and then returned to England and sold at a cheaper rate, than the rolling mills in England could supply them. Now Cleveland iron, it is true, is imported into Belgium from Middlesborough for *founndry* purposes ; but the girders sent to England are made of an entirely different description of pig iron smelted on the spot in Belgian furnaces.”

¹ Scrivenor, p. 269.

² Jeans, p. 267.

"Belgium, already referred to, as a country supposed to be able to compete on British soil with British ironmakers, in reality has not greatly altered her position during the last ten years, until 1880, when the make of iron showed an increase of 8 per cent. as compared with 1870.

"In the year 1865 this kingdom raised 1,018,000 tons of iron ore, but in 1876 this had fallen to 269,000 tons, of which 166,000 were imported chiefly to France. In 1881 the product was only 20,000, so that practically Belgium is entirely dependent on imported ore for her blast furnaces, the amount imported in 1881 being 1,169,206 tons, as against 301,000 in 1866, and 1,206,717 tons in 1882.

"Up to the year 1866 the duty on pig iron imported into Belgium was \$4.76, and on bar iron \$9.53 per ton; in that year they were reduced to \$1.01 and \$1.95 respectively. This alteration produced little effect on the quantity of pig received into the kingdom. In 1865, 24,864 tons were imported at the high duty, and two years after under the low duty, the quantity had only risen to about 42,549. The import gradually increased up to 1872 when it reached 137,000 tons. In the meantime, however, the home production had risen from 470,657 tons in 1865, to 655,595 tons in 1872.

"The following tables exhibit the position of the Belgian iron trade from 1870 to 1880, in thousands of tons :—

	1870.	1872.	1873.	Average of 4 years ending in 1878.	1880.
Pig Iron made.....	565	655	607	497	610
" " imported.	82	137	145	183	206
	647	792	752	680	816
" " exported.....	10	49	27	11	41
Consumed at home....	637	743	725	669	775
Malleable Iron made..	491	502	480	404	450
Steel made.....	6	15	21	81	95
Steel and iron.....	497	517	501	485	545

"The various articles of wrought iron or steel imported into Belgium are insignificant in amount, not exceeding 15,000 tons per annum. The cheap rate, however, at which ore and pig iron are imported, aided by cheap labour, has enabled that country to carry on an export trade fully equal to a consumption of one-third of the pig iron it has made and imported :—

EXPORTS FROM BELGIUM.

	1877.	1878.	1879.	1880.
	TONS.	TONS.	TONS.	TONS.
Steel (chiefly Rails).....	18,237	26,956	46,657	46,577
Iron Rails.....	42,599	34,273	29,596	28,124
Plates.....	16,223	23,198	23,301	32,302
Wire.....	20,36	2,898	3,393	4,560
Section Irons ¹	113,150	132,769	154,495	162,339
Nails.....	10,296	9,096	8,308	10,871
Unclassed.....	13,543	17,610	20,327	20,247
Castings.....	1,999	10,511	12,862	14,528
	218,083	257,351	298,939	319,548

"During the three years 1875, 1876 and 1877, England received of the above articles 33,792, 36,752, and 52,662 tons respectively; 52,000 tons is unquestionably a large quantity of malleable iron to be received by England from Belgium; but Belgium is the last place we ought to regard with any ill will in reference to such a transaction, seeing that at least three times the weight of British pig iron has been used up by the Belgian manufacturers.

"In 1881 and 1882 the weight of iron and steel received from Belgium was 50,100 and 43,800 tons respectively, while from Germany, which demands protection against British iron, 75,000 in the year 1881 and 72,000 tons in 1882 were landed at British ports.

Belgium has an area of English square miles.....	11,373
Population, Dec. 31st, 1878.....	5,476,668
" per square mile.....	569
Railways opened at end 1880.....	2,322
Lines operated by Government, at the end of 1880 consisted of	1,129

The commercial marine, on the decline for a number of years, consisted at the end of 1878 of

48 vessels aggregating.....	44,980 Tons
Including 23 steamers.....	29,850 "

RUSSIA.

The Iron Trade of Russia may be said to have been begun by Peter the Great. From the year 1753 to 1804, a considerable quantity of Iron was exported from Russia. Mr. Bell says all importations are now discouraged by imposing prohibitive duties as follows:—

Pig Iron.	Bar Iron.	Iron and Steel Rails.	Iron and Steel Plates.
\$2.83	\$19.16	\$23.92	\$26.35

¹ NOTE.—Section Irons are Beams, Channels, Angles, Tees, or any iron rolled to special shape or section.—J. H. B.

SWEDEN.

IRON TRADE.

In the year 1740, the Government established an office to promote the production of iron, by lending money on the ore at as low a rate as 4 per cent., and at that time a correct register was made of the mines which is still continued. Each forge has its particular mark stamped on the bars it produces, and all particulars regarding the quality, place of production, and shipment are registered. The smelting furnaces and iron works are licensed for a particular quantity, some being as low as 50 tons, others as high as 400 to 500 tons per annum: some few bar iron works draw licences for 1000 tons each. The licenses are granted by the College of Mines, which has control over all iron works and mining operations.

As the working of the mines is attended with considerable expense, and the sale of the iron uncertain, the Bank of Stockholm receives that metal as a proper security for a loan. The iron being duly appraised and lodged in the public warehouse, the proprietor receives three-fourths of its value at the interest of three per cent., and, when he can find an opportunity to dispose of his iron, it is again delivered to him on producing a certificate from the Bank that the loan upon it is duly discharged.

"In the year 1748 there were 496 foundries, with 539 large hammers, and 971 small ones, for making bar and other manufactures of iron which produced nearly 40,600 tons."¹

"Thanks to the judicious encouragement offered by the Government, the enterprise and sustained efforts of the Jernkontoret, the efforts of the people and the character of her resources, Sweden has for many years maintained a foremost place in the mining and metallurgical records of Europe."

The progress of the Bessemer manufacture in Sweden is shown by the following figures:—

								TONS.
In 1869 there were 4 Bessemer works which turned out 5,321								
" 1870	"	"	9	"	"	"	"	6,640
" 1871	"	"	6	"	"	"	"	4,453
" 1872	"	"	10	"	"	"	"	12,453
" 1873	"	"	16	"	"	"	"	15,695
" 1874	"	"	18	"	"	"	"	20,881

¹ Scrivenor, p. 146.

Rails were commenced to be manufactured in 1870.¹

In 1874 there were 33 steel works producing Bessemer, Martin, and other steel. With the exception of one works where steam was partially used, all the other great Bessemer works exclusively employ water power, some of the blowing machine motors having as much as 700 to 800 horse power.

Since the year 1878, cast steel has been made by the Martin process in a Siemens' regenerative furnace, with a Lundin condenser. The fuel consists partly of air dried wood; partly of machine-worked peat, air dried, and the consumption of these two kinds of fuel is approximately the same.

Four works can produce boiler plates; thin sheet iron for roofing is further made at ten works, and tyres, axles, railway wheels, of malleable iron, gun-barrels, springs and locks, tools, knives, arms, &c., are all made in the country.

Professor Richard Akermann of Stockholm furnishes the following statistics of the production and export for 1880-81 and exports of 1882, in metric tons = 2,204 lbs.

ARTICLES.	PRODUCTION.		EXPORTS.	
	Tons.	Tons.	Tons.	Tons.
	1880.	1881.	1881.	1882.
Iron ore.....	775,453	826,254	24,232	20,200
Pig Iron.....	405,765	435,499	55,489	55,500
Bar Iron.....	219,265	247,742	136,556	154,000
Rolled Wire and Rods.... }			52,000	56,000
Bessemer Steel.....	30,017	39,334	7,165	9,800
Martin Steel.....	7,719	11,159		
Other kinds of Steel.....	1,550	1,741	.....	.....
Plates.....	11,910	13,136	2,362	2,200
Nails.....	7,446	7,133	1,052	900
Blooms.....	.....	.....	88,02	8,000

The number of blast furnaces at work during 1881 was 179, and they were unitedly in blast 44,677 days. The number of Bessemer converters at work during 1881 was 28 at 14 works, and in 1882 there were 30 at work.

Ship-building.—The iron and shipbuilding industry of Sweden is worthy of notice.

In 1882, there were built in Swedish ship-yards a much larger number of iron and steel vessels than in any preceding year. Incom-

¹ Jeans, p. 278, 279.

plete statistics record the construction of 11 iron and two steel vessels, which were built chiefly for Russia and Norway, and most of the Swedish yards have contracts for steamers in hand sufficient to occupy them for some months.

Area of English square miles.....	170,979
Population, Dec. 31st, 1879, men.....	2,228,855
" " " women.....	2,350,046
	4,578,901

Per square mile, 27.

On 15th September, 1880, total length of railways opened for traffic, 3,570 English miles, of which 1,215 miles belonged to the state.

The commercial navy at the end of 1879 numbered 4,315 vessels, 536,510 tons.

	Tons.
3,563 sailing vessels.....	454,491
742 steamers.....	182,119
4,315	636,610

ITALY.

The production of Pig Iron annually amounts to about 50,000 tons, the greater part of the iron ore mined being exported to other countries, instead of being smelted at home, which is due to the lack of good furnace fuel. In the prosecution of other branches of the iron and steel trades, the Italians are more successful, using lignite as fuel in some important works. The Government encourages native enterprise by preferring articles of home production, if not more than 5 per cent. dearer than competing foreign articles duty paid.

"To build up an armour-plate works in Italy, the Government has contracted with a firm of capitalists, including Sir William Armstrong, of England, for 12,000 tons of armour plate at £80 per ton, and has advanced a considerable portion of the cost to facilitate the construction of the plant, which is to be constructed at Terni. It is also stated that a running contract for 15,000 tons of Siemen's steel ship-plates and angles has been granted to an establishment near Genoa, the price to be regulated by the rate prevailing in foreign markets, with the freights and duties added. Bar iron, beams, nails, &c., are manufactured in other works. No steel rails are made in Italy."¹

¹ American Iron and Steel Association, p. 89, 1885.

CONCLUSION.



Having reviewed our various attempts to manufacture iron, having ascertained the quantities and descriptions entering into our consumption; and having noted the methods practised and results followed and obtained by other countries, it remains to be seen what practical conclusions may now be drawn and lessons learnt.

The experience of the United States and other countries, seems to point to the advantage of specific in preference to *ad valorem* duties, as far as the iron trade is concerned. A previous reference has been made to "extras" and an extract now given from the same author shows how unfavourable to a local manufacturer an *ad valorem* duty may be, not only in this way but in the fact that, *the lower prices fall, the less protection there is* by the *ad valorem* method. When prices are high, much less protection is required than when the reverse is the case.

" Although price lists are printed and rules established for extras, these rules are subject to variations in special cases, an iron master will not always offer such low rates in a price-current, or in answer to a general enquiry, as he will when he has presented to him a specification containing the sizes, quantities and quality of iron actually required, with the periods and conditions of delivery and payment. He is then able to judge how far such an order will suit him at the particular time; and if it is suitable, or if it be a large order, or if his works are not well employed, then in many cases he will relax the ordinary rules, and offer prices more favourable to the purchaser, than the mere current price, and the nominal regulations as to extras would afford. It is the function of the iron merchant, or factor to act upon these circumstances, and where a miscellaneous list of plates, bars, or other kinds of iron is presented by a purchaser, to divide it, and to obtain each kind from the manufacturer best able to supply it. An acquaintance with the capacity of different rolling-mills, and with

the special facilities of each for making large, long, small, or heavy pieces, often enables the factor to supply a purchaser more favourably than can any one manufacturer."

Matheson's Aid to Purchase, p. 136.

BOUNTY ON THE MANUFACTURE OF PIG IRON IN CANADA.

A considerable amount of error is often noticed in statements regarding a bounty, granted by the Dominion Government on the manufacture of pig iron. The actual facts of the case are as follows: Beginning in 1867 with Confederation, Pig Iron was on the free list till 1880, when a specific duty of \$2 per ton of 2000 lbs. was imposed, which regulation is still in force.

By Act 46 Vic., chap. 14, authority was given for the payment of a Bounty on Pig Iron, manufactured in Canada, from Canadian ore. The Act provides that Pig Iron so manufactured, shall after the 1st of July, 1883, receive a bounty per ton of 2000 lbs., of *one dollar and fifty cents*, up to the 30th June, 1886, and *one dollar* from that date up to the 30th June, 1889.

The debit and credit of the account will now be examined.

The Government received for duty in the fiscal years ending June 30th.

				\$	c.
Cr.	1880	on	23,159 tons @ \$2.00	46,316.20	
	1881	"	43,630 " "	87,263.44	
	1882	"	63,431 " "	126,865.26	
	1883	"	77,493 " "	154,987.81	
	1884	"	52,184 " "	104,374.74	
Total,				\$519,807.45	

And paid in Bounty in

Dr.	1884	on	29,389 tons @ \$1.50	44,083.50
-----	------	----	----------------------	-----------

Balance to credit of the Pig Iron account.....\$465,723.95

Or, taking the year 1884 alone, after deducting the amount paid

in bounty, there remains a balance from the amount received for duty, of \$60,291.24 cts.

The majority of the pig iron imported into Canada, comes from Scotland, and is used principally in the manufacture of stoves and hollow-ware, all of which are thin castings. Scotch pig iron is particularly well suited for this purpose, being very fluid when hot, and the metal setting into small crystals when cold.

An objection is sometimes raised that in Canada we have no ores exactly similar to those smelted in Scotland, and consequently cannot produce pig iron as suitable for this purpose as the Scotch pig.

Without going into the question of the various ores, it seems to be a sufficient reply to this objection to cite the United States as an example: they make a thousand times more stoves and thin castings than we do, they do not have to import Scotch pig, but utilise the iron made from their own ores, and our ores in Canada are of the same quality and variety as those in the United States.

The importance of the manufacture of iron to this country is not fairly shown by merely taking the total value of the importations, enormous as they are, but the bearing of the subject on kindred industries must be examined, not to mention the scientific attainments required by the heads of departments and in the administration of the work. We are so fortunate as to possess mineral wealth in the shape of coal, not only underlying our vast North West Territories, but directly on both the Atlantic and Pacific Coasts. By reference to the Tabulated Statements previously given, the amounts mined on both shores will be seen. It is however particularly in regard to our Collieries in Nova Scotia, that this subject is at present of the greatest importance.

Coal was mined in Cape Breton as early as the year 1785, and, in the County of Pictou, in 1827; but from a variety of causes, the working of the mines has never been very profitable to their proprietors, the shares of the General Mining Association, the largest and earliest of the Coal Companies being quoted at present from £4 to £4 10s. for fully paid up £8 shares.¹

From 1854 to 1866, when, under the reciprocity treaty with the United States, Nova Scotia coal was admitted there free of duty, a large proportion of the output was sent there. In 1867 to 1871, a duty of \$1.25 per ton had to be paid, and under this restriction the trade declined; from 1872 to the present time, the duty has remained

¹ The Canadian Gazette, July 16th, 1885.

75 cents per ton, but the trade has fallen off to a very small tonnage, and may be expected to cease. The development of the coal fields in the United States, their railway facilities and rates are such, that even if the duty were removed, the trade would probably not return.

Having to depend now upon the home market almost altogether for custom, the duty of 60 cents per ton on bituminous coal coming into Canada, has been of assistance, and trade is increasing, but even with this amount of duty, Nova Scotia coal cannot reach further West than Brockville. A large proportion of all the coal is delivered by water, a regular fleet of steam colliers running between Montreal and Pictou, and Cape Breton, specially for this trade. This of course can only be done in the summer, for in the winter the collieries have to be idle, or bank the coal if they mine it. The following statement shows the actual facts of the case.

NOVA SCOTIA COLLIERIES.

Compiled from Official Returns.

Year.	Number of Collieries in operation.	Total number of persons employ'd	Total days labor.	Average number of days per person		Average number of tons per cutter.	Average tons per day per cutter.	Average quantity raised per day per tons.	Pits worked days.
				Under-ground.	Surface.				
1875	30	3,777	799,383	194	249	510	3.2	191	136
1876	26	3,229	683,138	202	230	555	3.2	181	170
1877	27	3,180	667,148	195	244	575	3.7	219	156
1878	25	3,135	663,850	194	251	566	4.0	274	141
1879	18	3,034	630,602	188	206	502	3.4	271	151
1880	19	3,332	778,683	220	260	690	3.5	290	193
1881	21	3,567	894,961	236	277	740	3.4	.....	217
1882	21	4,235	1,039,951	233	267	762	3.2	.....	236
1883	22	4,635	1,130,137	230	262	748	3.3	.....	226
1884	20	5,013	1,423,588	238	245	563	2.0	.....	196

It ceases to be a matter of surprise that the collieries are unremunerative when the small number of days in the year during which the pits were worked is noticed.

If, instead of all the coal being mined and shipped in its raw state, it was used in the manufacture of iron, which having labor expended on its production, would bear the cost of carriage where coal cannot, it would alter the present position of affairs.

In the United States, according to a Report on the manufacture of coke made by Mr. Jas. D. Weeks, special agent to the United States

Government in the census year 1880, and just published, "the development of the manufacture of coke during the past ten years, must be regarded as one of the marked achievements of their industrial progress."

The figures given are as follows:—

UNITED STATES.	1870.	1880.
Number of establishments.....	26	149
Number of persons employed.....	528	3,142
Amount of capital, real and personal.....	\$1,202,043	\$5,545,058
Wages paid.....	288,605	1,198,654
Value of all material used, including coal...	615,268	2,995,441
Value of coke produced.....	1,132,386	5,359,486
Total capital invested in coal works, supplying coal to coke works.....		13,060,041

A large part of this total is invested in coal lands.

"The making of crushed coke for domestic uses is an important business. In order to adapt it for general use without rendering it necessary to change stoves, grates or furnaces, the H. C. Frick Company (the largest operators at Connellsville, Pa.) conceived the idea of crushing into sizes to correspond with the size of anthracite coal, viz: egg, stove, small stove, and nut, so that parties ordering would have no difficulty in knowing just what size they required. It is used domestically for cooking, in base burning stoves, and in open grates. Large quantities are used at hotels for broiling purposes, it making a very clear and hot fire. Manufacturers of safes, chains, axles, shovels, files, bolts, agricultural implements, brass founders, maltsters, blacksmiths, etc., use the small stove or nut sizes. Steel manufacturers, as a rule, prefer the stove size for their crucible furnaces. Tube works use the egg size."¹

As small coal fit for coking, is at the present time almost valueless at many of the Nova Scotia Collieries, as it takes about two tons of coal for each ton of pig iron made, and as crushed coke will answer instead of anthracite coal for domestic purpose, it seems, as if we might be able to utilise an almost waste product of our mines, and at the same time save at least some of the large amounts of money we annually pay for iron and for anthracite coal.

¹ The Coal Trade, 1882, p. 18.

CANADIAN RAILWAYS.

The Official Railway Statistics state that ;

On 30th June, 1884, the total amount of Capital

Stock paid up was.....* \$557,615,069

Out of this amount,

Government Bonuses amounted to \$105,202,598

Do. Loans do. do. 39,593,963

Municipal Aid do. do. 9,934,556

\$154,741,117

And that a further amount of..... \$82,821,913
will be payable on completion of the Railways then in course of
construction.

Or, that out of a Capital per mile of Railway,
completed and under construction, amount-
ing in all to..... \$48,441.62c.

Government and Municipal aid came to..... 13,464.83

The amount of cash subsidy usually granted to Railways by the
Dominion Government, viz., \$3,200 per mile, is specially given to buy
rails.

Steel Rails form our largest single item of import, and are admit-
ted free of duty.

About twelve months ago the English manufacturers of Steel
Rails entered into a combination to advance the price of rails, which
had in January, 1884, fallen to just about one-half the price current
four years previously. The combination was broken for a time by
the action of the Canadian Pacific Railway Company placing an order
for ten thousand tons with makers in the United States, at lower
prices than could be obtained in England, but the combination is now
stronger than ever, having succeeded in inducing both the German
and Belgium makers to join them, with the result that prices are firm
at about \$5 per ton higher than before. Would it not be more to the
advantage of the Dominion to give a Bounty to any one making steel
rails in Canada, instead of paying it to the combination, particularly
as the ore out of which the great majority of rails are made, is not
mined and raised in England, but imported from abroad.

In our sister colony of New South Wales, which in 1882 had only

a total population of a little over 800,000, the Government recently advertised as follows:—"The Government of New South Wales, being desirous of encouraging the development of the local iron mining and iron and steel manufacturing industries, are prepared to receive tenders for 150,000 tons of steel rails," the rails to be manufactured in the colony and the delivery to extend over a period of ten years, being at the rate of 15,000 tons per year. Free passes over the Government system of railways being granted to any firm desiring to inspect the mineral deposits. In 1882, they only had 1,320 miles of railway opened for traffic, and 889 in course of construction. In that year they raised 2,109,283 tons of coal, which is very considerably more than we did in Canada.

It is also stated that within the last ten years "there were imported into New South Wales and Victoria (the two colonies join each other and are connected by railway) 1,250,000 tons of iron and steel, inclusive of the permanent way material required for Government and other railways constructed during the period mentioned."

The Government of this enterprising Colony, do not wait for any private firm to take the initiative, and propose what should be done, but come forward as they ought, and offer every assistance and inducements to manufacturers.

There were imported into the Dominion for the ten years ending June 30th, 1884, over 2,000,000 tons of iron, steel and rails, not including castings, forgings, cutlery, machinery, hardware, or engines.

A trite old proverb says: "The proof of the pudding is in the eating."

The only method of applying this saying to the Iron Trade, will be by making a comparison of prices.

The following figures are taken from the Trade Report of the *Montreal Gazette*, under date of Friday, July 24th, 1885, for Canada, and from the *Iron Trade Review*, of Cleveland, Ohio, of the same date, for the United States.

Prices in both cases are based on a credit of four months, and are f.o.b. at Montreal and Cleveland respectively.

CANADA.		PIG IRON.		UNITED STATES.	
Duty \$2.00 per ton, Bounty, \$1.50 per ton.				Duty \$6.72 per ton.	
Brand.	Price per gross ton.	Brand.	Price per gross ton.		
Coltness.....	\$17.50	No. 1. Ohio, Scotch, (Softener).	\$17.70		
Langloan.....	17.50	No. 2. " "	16.70		
Calder.....	16.50	No. 1. Foundry, all lake ore....	16.70		
Summerlee.....	16.50	No. 2. " " "	15.50		
Dalwellington.....	16.00	No. 1. Foundry, lake ores, with cinder mixture.....	16.00		
Eglington.....	15.00	No. 2. " " "	15.00		
BAR IRON.					
Duty, 17½% ad valorem.		Specific duty according to sizes.			
	Price per 100 lbs.			Price per 100 lbs.	
Bar Iron.....	\$1.65	Bar Iron.....		\$1.55	
SHEET IRON.					
Duty 12½ and 17½%, ad valorem. according to gauge.		Specific duty, 1½ to 1½ cents. per lb. according to gauge.			
Sheets.....	\$2.25	No. 22 to 24 G.....		\$2.90	
PLATES.					
Duty, 12½%, ad valorem.		Specific duty, 1½ cent. per pound.			
Plates.....	\$2.25 @ 2.50	C. No. 1 Boiler Plate.....		\$2.25	
CUT NAILS PER KEG OF 100 LBS.					
Specific duty, ½ cent per lb. and 10% ad val.		Specific duty, 1½ cent. per pound.			
10 dy. to 60 dy. hot cut, per kg.....	\$2.40	10 dy. to 60 dy. nails.	Prices weak at \$2.15		

From these figures it will be seen that, as might be expected from the non-protective character of our tariff, we are constantly draining ourselves of large amounts of money simply to pay for what we can and ought to make within our own borders, and that we do not even possess compensation and consolation in being able to purchase our iron any cheaper than it costs in the United States, where the policy opposite to our own, and surely the more enlightened one, prevails.

Now, however, that we have, through these pages, studied and ascertained our real position as respects this great industry, let us endeavour to profit by the experience of other nations, let us no longer apathetically permit our opportunities to run to waste, but determine rather to build up, in our own Dominion, our own iron industries, until they become as they assuredly may and should, an ever increasing source of national wealth and strength.

ce per
s ton.
7.70
3.70
3.70
5.50

6.00
5.00

00 lbs.
\$1.55

\$2.90

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APPENDIX.

EXTRACTS FROM A COMPARATIVE STATEMENT
OF THE
RATES of IMPORT DUTIES
INTO
THE UNITED STATES,
UNDER THE
SEVERAL TARIFF ACTS FROM 1789 TO 1883 INCLUSIVE.

PREPARED BY
THE COMMITTEE ON FINANCE, UNITED STATES SENATE.
1884.

ARTICLES ENUMERATED.

[illegible]

III.—COMPARATIVE STATEMENT OF THE RATES OF IMPORT DUTIES

1874, BOTH

ARTICLES ENUMERATED.		Act of July 30, 1846.	Act of Mar. 3, 1857.	Act of Mar. 2, 1861.
1	Iron, old scrap.....	30 per cent.	24 per cent...	Ton, \$6.....
2	cast.....			
3	wrought.....			
4	pig.....	30 per cent.	24 per cent...	Ton, \$6.....
5	in bars, blooms, bolts, loops, rods, slabs (more ad- vanced than pig, less than bars), or other form....	30 per cent.	24 per cent...	Ton, \$15.....
6	bars, rolled or hammered, n.o.p., including flats not less than 1 inch nor more than 7 inches wide, nor less than ½ inch nor more than 2 inches thick, and rounds less than ½ inch or more than 4 inches dia- meter, and squares not less than ½ inch or more than 4 inches square.....			Ton, \$15.....
7	ditto, including flats not less than 1 nor more than 2 inches wide, ½ to 2 inches thick, value under \$50 per ton.....			
8	ditto, ditto, value over \$50 per ton.....			
9	bars, rolled or hammered, comprising flats less than 7 inches wide, rounds less than ½ inch or more than 4 inches in diameter, and squares less than ½ inch or more than 4 inches square.....			
10	ditto, including flats, not less than 1 inch nor more than 6 inches wide, nor less than ½ inch nor more than 2 inches thick, and rounds not less than ½ inch nor more than 2 inches in diameter, and squares not less than ½ inch nor more than 2 inches square.....			
11	ditto, including flats less than ½ inch and not more than 2 inches thick nor less than 1 inch or more than 6 inches wide, rounds less than ½ inch or more than 2 inches in diameter, and squares less than ½ inch or more than 2 inches square.....			
12	other descriptions of rolled or hammered, n.o.p.....			Ton, \$20.....
13	bars, for railroads or inclined planes, made to pattern and fitted to be laid down, not above 6 inches high, band, hoop, slit, rolled or hammered (1862), and scroll from ½ inch to 6 inches wide, not below ½ thick (1864).....	30 per cent.	24 per cent...	Ton, \$20.....
15	ditto, from ½ inch to 6 inches wide, less than ½ thick, not less than No. 20 wire gauge.....			
16	ditto, thinner than No. 20 wire gauge.....			Ton, \$20.....
17	boiler and other plate.....			Ton, \$20.....
18	not less than 3-16 inch thick.....			Ton, \$20.....
19	rods, nail, or spike, slit, rolled or hammered.....			Ton, \$20.....
20	sheet, smooth or polished, all.....			Pound, 2 cts.
21	galvanised or coated with zinc.....			Pound, 2 cts.
22	other, common or black, not thinner than No. 20 wire gauge.....			Ton, \$20.....
23	thinner than No. 20, not thinner than No. 25.....			Ton, \$25.....
24	thinner than No. 25.....			Ton, \$30.....
25	squares, marked on one side.....			
26	all other, of iron or steel.....			
27	anchors and parts thereof.....			Pound, 1½ cts.
28	andirons, cast.....			
29	anvils.....			Cwt., \$1.25...
30	axles, and parts thereof.....			Pound, 2 cts.
31	blacksmiths' hammers or sledges.....			Pound, 2 cts.
32	bolts, wrought.....			Pound, 2 cts.
33	bolts, cast.....			Pound, 2 cts.
34	castings, n.o.p., 2½ inches or more in diameter.....	30 per cent.	24 per cent...	Cwt., \$1.25...
35	cables or chains, or parts thereof.....			
36	chains, trace, halter, or fence, of wire or rods, ½ inch in diameter or more.....			Pound, 1½ cts.
37	ditto, under ½ inch, not less than ¼ inch diameter....			Pound, 2 cts.
38	ditto, under ½ inch, not less than No. 9 wire gauge....			Pound, 2½ cts.
39	ditto, under No. 9 wire gauge.....			25 per cent...
40	hatters' irons.....			Pound, 1 cent
41	hinges, cast.....			Pound, 2 cts.
42	hinges, wrought.....			Pound, 1½ cts.
43	hollowware, glazed, tinned.....			Pound, 2½ cts.
44	malleable, in castings.....			Pound, 2 cts.
45	mill irons and cranks.....			Pound, 1½ cts.

UNDER THE SEVERAL TARIFF ACTS, FROM JULY 30, 1846, TO JUNE 21, INCLUSIVE.

Acts of Aug. 5, 1861. Dec. 24, 1861.	Acts of July 14, 1862. Mar. 3, 1863.	Acts of June 30, 1864. Mar. 3, 1865. Mar. 16, 1866. May 16, 1866. June 1, 1866.	Acts of July 28, 1866. Mar. 2, 1867. Mar. 22, 1867.	Acts of Mar. 25, 26, 27, 1867. Feb. 3, 1868. July 20, 1868. Feb. 19, 24, 1869.	Acts of July 14, 1870. Dec. 22, 1870.	Acts of May 1, 1872. June 6, 1872.	
Ton, \$6	Ton, \$6	Ton, \$8	Ton, \$8	Ton, \$8	Ton, \$6		1
.....	.....	.....	.....	.....	Ton, \$6		2
Ton, \$6	Ton, \$6	Ton, \$9	Ton, \$9	Ton, \$9	Ton, \$8		3
.....	.....	.....	.....	.....	Ton, \$7		4
As iron in bars .....	.....	.....	.....	.....	.....		5
.....	.....	.....	.....	.....	.....		6
Ton, \$15 .....	.....	.....	.....	.....	.....		7
.....	Ton, \$17 .....	.....	.....	.....	.....		8
.....	Ton, \$18 .....	.....	.....	.....	.....		9
.....	.....	.....	.....	.....	.....		10
.....	.....	Pound, 1 cent	Pound, 1 cen.	Pound, 1 cent	Pound, 1 cent		11
Ton, \$20	Ton, \$25	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		12
Ton, \$12	Ton, \$13.50	100 lbs., 60 & 70 cts.	100 lbs., 70 cts.	100 lbs., 70 cts.	100 lbs., 70 cts.		13
Ton, \$20	Ton, \$25	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	90 pr. cent. of existing duties.	14
.....	.....	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		15
.....	.....	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		16
Ton, \$20	Ton, \$25	Ton, \$25	Ton, \$28	Ton, \$25	Ton, \$25		17
.....	.....	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		18
Ton, \$20	Ton, \$25	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		19
Pound, 2 cts.	Pound, 2½ cts.	Pound, 3 cts.	Pound, 3 cts.	Pound, 3 cts.	Pound, 3 cts.		20
Pound, 2 cts.	Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		21
Ton, \$20	Ton, \$23	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		22
Ton, \$25	Ton, \$29	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		23
Ton, \$30	Ton, \$35	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		24
lb., 2½ cts., & 30 p. c.	lb., 3 cts., & 30 p. c.	lb., 3 cts., & 30 p. c.	lb., 3 cts., & 30 p. c.	lb., 3 cts., & 30 p. c.	lb., 3 cts., & 30 p. c.		25
lb., 5 cts., & 30 p. c.	lb., 6 cts., & 30 p. c.	lb., 6 cts., & 30 p. c.	lb., 6 cts., & 30 p. c.	lb., 6 cts., & 30 p. c.	lb., 6 cts., & 30 p. c.		26
Pound, 1½ cts.	Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		27
Cwt., \$1.25	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		28
Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		29
Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		30
Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		31
Pound, 2 cts.	Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		32
25 per cent.	30 per cent.	30 per cent.	30 per cent.	30 per cent.	30 per cent.		33
Cwt., \$1.25	Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		34
.....	.....	.....	.....	.....	.....		35
Pound, 1½ cts.	Pound, 1½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		36
Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		37
Pound, 2½ cts.	Pound, 3 cts.	Pound, 3 cts.	Pound, 3 cts.	Pound, 3 cts.	Pound, 3 cts.		38
25 per cent.	30 per cent.	35 per cent.	35 per cent.	35 per cent.	35 per cent.		39
Pound, 1 cent	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.	Pound, 1½ cts.		40
Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		41
Pound, 1½ cts.	Pound, 1½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		42
Pound, 2½ cts.	Pound, 3 cts.	1 und, 3½ cts.	Pound, 3½ cts.	Pound, 3½ cts.	Pound, 3½ cts.		43
Pound, 2 cts.	Pound, 2 cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.	Pound, 2½ cts.		44
Pound, 1½ cts.	Pound, 1½ cts.	Pound, 2 cts.	Pound, 2 cts.	Pound, 2 cts.	Pound, 2 cts.		45

III.—COMPARATIVE STATEMENT OF THE RATES OF IMPORT DUTIES

1874, BOTH

	ARTICLES ENUMERATED.	Act of July 30, 1846	Act of Mar. 3, 1857.	Act of Mar. 2, 1861.
45	Iron moisie			
46	nails and spikes, cut			Pound, 1 cent.
47	board nails, wrought (spikes and rivets)			Pound, 2 cts.
48	nails, horse shoe			Pound, 3 cts.
49	nuts and washers, wrought, ready punched			Ton, \$25
50	pipe, cast, for steam, gas or water			Pound, 1 cent.
51	railroad chairs, wrought			Ton, \$23
52	sad irons			Pound, 1 cent.
53	screws, bed			Pound, 1 cent.
54	wood screws, over 2 inches in length			Pound, 5 cts.
55	under 2 inches in length			Pound, 8 cts.
56	washed or plated, and all other			30 per cent.
57	stoves and stove plates, of cast iron			Pound, 1 cent
58	tailors' irons			Pound, 1 cent
59	tacks, brads, sprigs, cut, not exceeding 16 ounces per mille			Mille, 2 cts.
60	exceeding 16 ounces per mille			Pound, 2 cts.
61	tappers' iron			10 per cent.
62	tire for locomotives			Pound, 1 cts.
63	tubes, flues, &c., for steam, gas, and water, wrought			Pound, 2 cts.
64	vessels, cast iron, n.o.p.	30 per cent.	24 per cent.	Pound, 1 cent.
65	wire, bright, coppered or tinned, drawn and finished, not above 1/8 inch in diameter, nor thinner than No. 16 wire gauge			100 lbs., 75 cts. & 15 p. c.
66	thinner than No. 16, not thinner than No. 25			100 lbs., \$1.50 & 15 p. c.
67	beyond No. 25			100 lbs., \$2 & 15 per cent.
68	covered, cotton, silk, &c. (additional)			Pound, 5 cts.
69	wrought, for ships, locomotives, or parts thereof, weighing 25 pounds or more			Pound, 1 cts.
70	all manufactures of, n.o.p.	30 per cent.	24 per cent.	30 per cent.
71	iron and steel rods, bars, spikes, nails, and bolts necessary for construction of vessels built in United States for foreign trade			
72	Cutlery of all kinds	30 per cent.	24 per cent.	30 per cent.
73	Steel, unmanufactured, n.o.p.	20 per cent.	20 per cent.	
74	in ingots, bars, coils, and sheets	15 per cent.	15 per cent.	
75	valued at 7 cents or less per pound			Pound, 1 cts.
76	valued at above 7 cents, not above 11 cents per pound			Pound, 2 cts.
77	valued at above 11 cents per pound			
78	in any other form, n.o.p.			20 per cent.
79	wire, not less than 1/8 inch in diameter, valued at 7 cents or less per pound			Pound, 1 cts.
80	valued at above 7 cents, not above 11 cents per pound			Pound, 2 cts.
81	valued at above 11 cents per pound			
82	less than 1/8 inch in diameter, not less than No. 16 wire gauge			Pound, 2 cts. & 15 p. c.
83	less or finer than No. 16			Pound, 2 cts. & 15 p. c.
84	crimoline, corset, and hat wire			
85	all, n.o.p.			20 per cent.
86	railway bars			
87	part steel			
88	squares			
89	manufactures of, n.o.p.	30 per cent.	30 per cent.	30 per cent.

[illegible]

IV.—COMPARATIVE STATEMENT OF THE RATES OF IMPORT DUTIES UNDER THE SEVERAL TARIFF ACTS, FROM JUNE 22, 1874, TO JANUARY 1, 1884.

[NOTE.—Portions of the text inclosed in parentheses indicate additions made by the Act of March 3, 1883. Portions of the text in italics indicate such parts of previous law as are re-enacted in a new form, or are entirely omitted. Letters "n.o.p.f." signify not otherwise provided for. Letters "n.s.p.f." not specially provided for.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of ch 3, 1883.
Iron, band. (See Hoop below.) bar, rolled or hammered, comprising— flats, less than $\frac{3}{4}$ inch or more than 2 inches thick, or less than 1 inch or more than 6 inches wide; rounds less than $\frac{3}{4}$ or more than 2 inches in diameter; squares less than $\frac{3}{4}$ or more than 2 inches square flats, not less than 1 inch nor more than 6 inches wide, nor less than $\frac{3}{4}$ nor more than 2 inches thick; rounds not less than $\frac{3}{4}$ nor more than 2 inches in diameter; squares not less than $\frac{3}{4}$ nor more than 2 inches square (flats not less than 1 inch wide nor less than $\frac{3}{4}$ of 1 inch thick). round iron not less than $\frac{3}{4}$ of 1 inch in diameter, and square iron not less than $\frac{3}{4}$ of 1 inch square flats less than 1 inch wide, or less than $\frac{3}{4}$ of 1 inch thick; round iron less than $\frac{3}{4}$ of 1 inch, and not less than 7-16 of 1 inch in diameter; and square iron less than $\frac{3}{4}$ of 1 inch square) (Provided, That all iron in slabs, blooms, loops, or other forms less finished than iron in bars, and more advanced than pig-iron, except castings, shall be rated as iron in bars, and pay a duty accordingly; and none of the above iron shall pay a less duty than) (Provided further, that all iron bars, blooms, billets, or sizes or shapes of any kind, in the manufacture of which charcoal is used as fuel, shall be subject to a duty of bar (cold rolled), additional duty. (See Steel ingots) bars or shapes of rolled iron, n.o.p.f. (See Forgings) blooms. (See Bar-iron, above.) loops. (See Bar-iron, above.) slabs. (See Bar-iron, above.) charcoal. (See Bar-iron, above.) blanks, pressed, sheared, or stamped shapes, or of combination of steel and iron, punched or not punched. (See Steel ingots.) (boiler or other plate iron) (sheared or unsheared). (See also Sheet iron, below) not less than 3-16 of an inch in thickness n.o.p.f. (skelp iron, sheared or rolled in grooves). (See also Sheet iron, below) (flat, with longitudinal ribs, for the manufacture of fencing). (forgings of iron and steel, or forged iron, of whatever shape or in whatever stage of manufacture, not specially enumerated or provided for in this Act) forgings of iron and steel, for vessels, steam engines, and locomotives, or parts thereof, weighing, each, 25 pounds or more (hoop, or band, or scroll, or other iron, 8 inches or less in width, and not thinner than No. 10 wire-gauge, and not thinner than No. 20 wire gauge thinner than No. 20 wire-gauge band, hoop, and scroll iron, from $\frac{1}{2}$ to 6 inches wide, not thinner than $\frac{1}{4}$ inch under $\frac{1}{4}$ inch, and not thinner than No. 20 wire-gauge thinner than No. 20 wire-gauge Provided, That all articles not specially enumerated or provided for in this Act, whether wholly or partly manufactured, made from sheet, plate, hoop, band, or scroll iron herein provided for, or of which such sheet, plate, hoop, band, or scroll iron shall be the material of chief value, shall pay $\frac{1}{2}$ of 1 cent per pound more duty than that imposed on the iron from which they are made or which shall be such material of chief value)	Pound, 1½ cents. Pound, 1 cent. Pound, 8-10 cent. Pound, 1 cent. Pound, 11-10 cents. 35 per cent Ton, \$22. Pound, 1 cent. Pound, 1½ cents. Pound, 1½ cents. Ton, \$25. Pound, 1½ cents. Pound, 6-10 cent. Pound, 2½ cents. Pound, 2 cents. Pound, 1 cent. Pound, 12-10 cents. Pound, 14-10 cents. Pound, 1½ cents. Pound, 1½ cents. Pound, 1½ cents.	Pound, 8-10 cent. Pound, 1 cent. Pound, 11-10 cents. 35 per cent Ton, \$22. Pound, 1 cent. Pound, 12-10 cents. Pound, 1½ cents. Pound, 6-10 cent. Pound, 2½ cents. Pound, 2 cents. Pound, 1 cent. Pound, 12-10 cents. Pound, 14-10 cents. Pound, 1½ cents. Pound, 1½ cents. Pound, 1½ cents. Pound, ½ cent. additional.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160, for explanation of text in italics and parentheses.]

ARTICLES NUMERATED.	Rev. Stat. of June 22, 1874.		Act of March 3, 1883.
	Acts of February 8, 1875, March 3, 1875, July 1, 1879, June 14, 1880, May 6, 1882, Dec. 23, 1882.		
Iron, junk. (See Junk.)			
(kuntledge)			Pound, 3-10 cent
(ore)	20 per cent		Ton, 75 cents.
including mangiferous iron ore			Ton, 75 cents.
also the dross or residuum from burnt pyrites			Ton, 75 cents.
sulphur ore, as pyrites or sulphuret of iron in its natural state, containing not more than 31 per centum of copper			Ton, 75 cents.
<i>Provided</i> , That ore containing more than 2 per centum of copper shall pay, in addition thereto, per pound for the copper contained therein)			Pound, 2½ cents.
in pigs	Ton, \$7		
(iron kuntledge)	30 per cent		
spiegeleisen)	Ton, \$7		Pound, 3-10 cent
wrought and	Ton, \$8		
cast scrap-iron (and	Ton, \$6		
scrap-steel)	30 per cent		
But nothing shall be deemed scrap-iron or scrap-steel except waste or refuse iron or steel that has been in actual use and is fit only to be remanufactured.			
plate. (See Sheet-iron, below, and Boiler or other plate, above.)			
(railway-bars, weighing more than 25 pounds to the yard)	Pound, 7-10 cent.		Pound, 7-10 cent.
made in part of steel weighing more than 25 pounds to yard bars for railroads or inclined planes)	Pound, 1 cent.		Ton, \$17.
rolled in bars or shapes, n.o.p.f.	100 lbs., 7 cents.		
100 lbs., 11 cents.			Pound, 1 2-10 cents.
(round, in coils or rods, less than 7-16 of 1 inch in diameter, and bars or shapes of rolled iron not specially enumerated or provided for in this Act)			Pound, 1 2-10 cents.
rust allowances. (See after Wrought-iron.)			
scrap, wrought or cast. (See Iron, pig, above)			
scrap. (See Hoop-iron above.)			
sheet-iron, common or black (thinner than 1 inch and ½ and not thinner than No. 20 wire-gauge	Pound, 1½ cents		Pound, 1 1-10 cents.
thinner than No. 20 wire-gauge, and not thinner than No. 25 wire-gauge	Pound, 1½ cents		Pound, 1 2-10 cents.
thinner than No. 25 wire-gauge, and not thinner than No. 29 wire-gauge	Pound, 1½ cents		Pound, 1 5-10 cents.
(thinner than No. 29 wire-gauge)	Pound, 1½ cents		
and all iron commercially known as common or black taggers' iron (whether put up in boxes or bundles or not)	30 per cent		30 per cent.
(<i>And provided</i> , That on all such iron and steel sheets or plates aforesaid, excepting on what are known commercially as tin-plates, terne-plates, and taggers' tin, and hereafter provided for, when galvanized or coated with zinc or spelter or other metals, or any alloy of those metals) per pound additional. (See Boiler iron, above)	Pound, 2 or 2½ cents		Pound, ½ cent.
sheet (or sheet-steel), smooth or polished (planished or glazed), by whatever name designated	Pound, 3 cents		Pound, 2½ cents.
(<i>Provided</i> , That plate or sheet or taggers' iron, by whatever name designated, other than the polished, planished, or glazed herein provided for, which has been pickled or cleaned by acid or by any other material or process, and which is cold-rolled, shall pay ½ cent per pound more duty than the corresponding gauges of common or black sheet or taggers' iron)			Pound, ½ cent additional.
(sheet iron or steel corrugated or crimped.) (See Iron sheets or plates, below)			Pound, 1 4-10 cents.
iron and tin plates galvanized or coated with any metal by electric batteries	Pound, 2 cents.		
coated otherwise than by electric batteries)	Pound, 2½ cents.		
with rods	Pound, 1½ cents		
sheets and plates, additional duty. (See Sheet-iron, above.)			
(or steel) sheets, or plates, or taggers' iron, coated with tin or lead, or with a mixture of which these metals is a component part, by the dipping or any other process, and commercially known as (tin-plates, terne-plate, and taggers' tin)	Pound, 1 7-10 cents		Pound, 1 cent.
(corrugated or crimped sheet-iron or steel)			Pound, 1 4-10 cents.
(spiegeleisen) (See Iron, pig, above)			Pound, 3-10 cent.
steel, description of. (See Steel.)			

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 100 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of March 3, 1883
Iron, taggers', common or black. (See Sheet-iron, above) (cold-rolled and pickled, or cleaned by acid, or other- wise.) (See Sheet-iron, above)	30 per cent	30 per cent.
(or steel) (wire rods, round, in coils and loops, for the manu- facture of rivets, screws, nails, and fences, not lighter than No. 5 wire-gauge, valued at not over 3 cents per pound)		30 per cent. and cent per pound.
<i>round iron, in coil, 3-16 of an inch or less in diameter, whether coated with metal or not so coated, and all descriptions of iron wire, and wire of which iron is a component part, not other- wise provided for. (See Wire.)</i>		Pound, 6-10 cent.
wrought, for ships, or parts thereof, weighing 25 pounds or more. (See Anvils, below)	Pound, 2 cents	Pound, 2 cents.
(No allowance or reduction of duties for partial loss or damage in consequence of rust or discoloration shall be made upon any description of iron or steel, or upon any partly manufactured article of iron or steel, or upon any manufacture of iron or steel) <i>except on polished Russian sheet iron.</i>		
manufactures of, anchors, or parts of	Pound, 2 cents	
andirons, cast	Pound, 1½ cents	
anvils	Pound, 2 cents	
anchors, or parts thereof	Pound, 2 cents	
mill-irons and mill-trunks, of wrought iron and wrought iron for ships	Pound, 2 cents	Pound, 2 cents .
(and forgings of iron and steel for vessels), steam engines, and locomotives, or parts thereof, weighing each 25 pounds or more)	Pound, 2 cents	
<i>chains, trace, halter, and fence, made of wire or rods—not less than ½ inch in diameter</i>	Pound, 2½ cents	
<i>less than ½ inch in diameter, and not under No. 9 wire gauge</i>	Pound, 3 cents	
<i>under No. 9 wire-gauge</i>	35 per cent	
<i>cables or cable chains, or parts thereof: two cents and a half per pound: Provided, That no chains made of wire or rods of a diameter of less than one-half of one inch, shall be considered a chain cable.</i>		
angles. (See Beams, below)		
(axle-bars)		
(blanks)		
(or steel) axles, parts thereof, (axle-bars, axle-blanks, or forg- ings for axles, without reference to the stage or state of manufacture)		Pound, 2½ cents.
(or steel beams, girders, joists, angles, channels, car-truck channels, T columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel)		
(or steel) blacksmiths' hammers and sledges	Pound, 2½ cents	Pound, 1½ cents.
(track tools)		
(wedges, and)		Pound, 2½ cent.
(crowbars)		
(boiler tubes, or flues, or stays, of wrought iron or steel)		Pound, 3 cents.
(other wrought iron or steel tubes or pipes)		Pound, 2½ cents.
<i>steam, gas, or water tubes, and flues of wrought iron</i>	Pound, 3½ cents	
(bolt blanks.) (See Rivets, below)	35 per cent	
bolts		Pound, 2½ cents.
<i>with or without threads or nuts. (See Rivets, below)</i>		
brads, sprigs, or tacks, cut, not over 16 ozs. to the M. (See Cut tacks, below)	Per M. 2½ cents	Per M. 2½ cents.
<i>over 16 ozs. to the M.</i>	Pound, 3 cents	Pound, 3 cents.
building-forms. (See Beams.)		
bulb-beams. (See Beams, above.)		
cast-iron vessels, plates, stove-plates, andirons, sadirons, tailors' irons, butters' irons	Pound, 1½ cents	
and all other castings of iron not specially enumerated or pro- vided for in this Act	30 per cent	Pound, 1½ cents.
cast-iron pipe (of every description) <i>(steam, gas, and water)</i>	Pound, 1½ cent	Pound, 1½ cents.
<i>butts and hinges.</i>	Pound, 2½ cents	
(castings, n.o.p.f.) (See Cast iron above)		Pound, 1½ cents.
<i>malleable, n.o.p.f.</i>	Pound, 2½ cents	Pound, 2 cents.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875 March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of March 3, 1883.
Iron (chain or chains of all kinds, made of iron or steel, not less than three-fourths of one inch in diameter).....		Pound, 1½ cents.
(less than three-fourths of one inch and not less than three-eighths of one inch in diameter).....		Pound, 2 cents.
(less than three-eighths of one inch in diameter).....		Pound, 2½ cents.
channels, car-truck channels. (See Beams, above.)		
columns and posts. (See Beams, above.)		
(and steel cotton-ties, or hoops, for baling purposes, not thinner than No. 20 wire-gauge).....		35 per cent.
(crow-bars.) (See Blacksmiths' hammers, above).....		Pound, 2½ cents.
(deck-beams.) (See Beams, above.)		
(fish-plates or splice-bars.) (See Railway, below).....		Pound, 1½ cents.
flues, wrought. (See Boiler tubes, above).....	Pound, 3½ cents.	Pound, 3 cents.
(forgings.) (See Iron forgings, above).....		Pound, 2½ cents.
(forged shot-gun barrels, rough bored).....		10 per cent.
(girders.) (See Beams, above.)		
hatters' irons, cast. (See Cast iron, above).....	Pound, 1½ cents.	Pound, 1½ cents.
hinges.....	Pound, 2½ cents.	
(finished and hinge blanks.) (See Rivets, below).....		Pound, 2½ cents.
(hob-nails.) (See Horseshoe-nails, below).....		Pound, 1 cent.
hollow-ware (coated), glazed or tinned.....	Pound, 3½ cents.	Pound, 3 cents.
hoops, for baling purposes.....	35 per cent.	
not thinner than No. 20 wire-gauge. (See Cotton ties, above).		35 per cent.
hoops, other, wholly or partly manufactured. (See Hoop, Band, and Scroll.)		
horseshoe-nails.....	Pound, 5 cents.	
hob-nails and wire nails, and all other wrought (iron or steel) steel nails, (not specially enumerated or provided for in this Act).....		Pound, 4 cents.
(horseshoes.) (See Spikes below).....		Pound, 2 cents.
magnets.....	Free.	Free.
malleable castings. (See Castings, above).....	Pound, 2½ cents.	Pound, 2 cents.
manufactures of, n.o.p.f.	35 per cent.	45 per cent.
mill-irons and mill-cranks. (See Anvils, above).....	Pound, 2 cents.	{ Pound, 2 cents.
(mule-shoes.) (See Spikes, below).....		{ Pound, 1½ cents.
nails, cut, and spikes (of iron or steel).....	Pound, 1½ cents.	
(hob.) (See Horseshoe-nails, above).....		
horseshoe. (See Horseshoe-nails, above).....	Pound, 5 cents.	Pound, 4 cents.
(wire nails.) (See Horseshoe nails, above).....		
wrought (<i>board</i>), n.o.p.f. (See Horseshoe nails, above).....	Pound, 2½ cents.	
nuts, wrought. (See Spikes, below).....	Pound, 2 cents.	{ Pound, 2 cents.
(ox-shoes.) (See Spikes, below).....		{ Pound, 7-10 cent.
railway-bars, weighing more than 25 pounds to the yard).....	Pound, 1 cent.	
(weighing more than 25 pounds to the yard).....		Ton, \$17.
<i>bars for railroads or inclined planes.</i>	100 lbs., 70 cents.	
(rails, flat, punched.) (See Rails, below).....		Pound, 8-10 cent.
(rails, <i>tee</i> , (or steel), weighing not over 25 pounds to the yard).....		Pound, 9-10 cent.
(iron or steel flat rails, punched).....		Pound, 8-10 cent.
(railway fish-plates or splice-bars).....		Pound, 1½ cents.
(tires.) (See Tires, below).....		Pound, 24 cents.
ribs, stretchers, &c. (See Umbrellas).....		
(or steel) wrought board nails.....	Pound, 2½ cents.	
bolts (with or without threads or nuts, or bolt-blanks, and finished hinges or hinge-blanks).....	35 per cent.	Pound, 2½ cents.
sad-irons. (See Cast-iron).....	Pound, 1½ cents.	Pound, 1½ cents.
screws, commonly called wood-screws, two inches or over in length.....		
one inch and less than two inches in length.....	Pound, 8 cents.	Pound, 6 cents.
over one-half inch and less than one inch in length.....	Pound, 11 cents.	Pound, 8 cents.
one-half inch and less in length.....	Pound, 11 cents.	Pound, 10 cents.
of any other metal than iron, and all other screws of iron, except wood screws.....	35 per cent.	
bed and wrought-iron hinges.....	Pound, 2½ cents.	
(shoes, horse, mule, or ox.) (See Spikes, below).....		Pound, 2 cents.
skates costing 20 cents or less per pair.....	Pair, 8 cents.	
over 20 cents per pair.....	35 per cent.	
sledges, blacksmiths'. (See Blacksmiths).....	Pound, 2½ cents.	Pound, 2½ cents.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1875. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of March 3, 1883.
Iron, wrought (or steel) <i>railroad chairs</i> <i>spikes</i> <i>washers, ready punched</i> <i>spiral furniture springs, manufactured from iron wire</i> <i>sprigs, not exceeding 16 ozs. to the M.</i> <i>exceeding 16 ozs. to the M.</i> <i>squares, marked on one side</i> <i>all other, of iron or steel</i> <i>(stays, boiler, wrought)</i> <i>stove-plates, cast. (See Cast iron).</i> <i>(structural shapes of iron or steel.) (See Beams, above.)</i> <i>(tires, iron or steel, locomotive, car, and other railway, or parts thereof, wholly or partly manufactured.) (See Steel wheels).</i> <i>tees. (See Beams above.)</i> <i>wire. (See Wire.)</i>	Pound, 2 cents Pound, 2½ cents Pound, 2 cents Pound, 2 cents Pound, 2 cents, & 15 per cent. Per M. 2½ cents Pound, 3 cents Pound, 3 cents, & 30 per cent. Pound, 6 cents, & 30 per cent. Pound, 1½ cents	Pound, 1½ cent. } Pound, 2 cents. Per M. 2½ cents. Pound, 3 cents. Pound, 2½ cents. } Pound, 1½ cents. Pound, 2½ cents.
Saws <i>(circular)</i> <i>cross-cut</i> <i>back</i> <i>hand</i> <i>and all other saws, not specially enumerated or provided for in this Act</i> <i>mill, pit, drag, and saws not over nine inches wide, per lineal foot</i> <i>over nine inches wide, per lineal foot</i>	Per foot, 10 cents 75 cents and \$1 a dozen, and 30 per cent. Lineal foot, 12½ cts. Lineal foot, 20 cts. 30 per cent. 45 per cent.	30 per cent. Lin. feet, 8 cents. 40 per cent. Lineal foot, 10 cts. Lineal foot, 15 cts. 45 per cent.
Steel, in any form, n.o.p.f. and all manufactures of steel n.o.p.f. <i>All manufactures of steel, or of which steel shall be a component part, not otherwise provided for; but all articles of steel partially manufactured, or of which steel shall be a component part, not otherwise provided for, shall pay the same rate of duty as if wholly manufactured.</i> <i>definition of—(Provided, That all metal produced from iron or its ores, which is cast and malleable, or of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron or its ores, by the crucible, Bessemer, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by the combination of two or more of the processes, or their equivalents, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast and malleable, excepting what is known as malleable iron castings, shall be classed and denominated as steel, and metal converted, cast or made, from iron by the Bessemer or pneumatic process of whatever form or description shall be classed as steel.</i> <i>(alloys used as substitutes for steel tools</i> <i>bands of, all gauges and widths</i> <i>bars, beveled or tapered</i> <i>billets</i> <i>blanks, die</i> <i>pressed, sheared, or stamped, of sheet or plate steel, or combination of iron and steel, punched or not</i> <i>blocks, die</i> <i>blooms, by whatever process made</i> <i>castings, all descriptions and shapes of, whether dry sand, loam, or iron molded</i> <i>cogged ingots</i> <i>connecting rods</i> <i>crank-pins</i> <i>shafts</i> <i>die-blanks</i> <i>blocks</i> <i>gun-molds, not in bars</i>	Lineal foot, 12½ cts. Lineal foot, 20 cts. 30 per cent. 45 per cent. Lineal foot, 10 cts. Lineal foot, 15 cts. 45 per cent. See rates below.	Lineal foot, 10 cts. Lineal foot, 15 cts. 45 per cent. See rates below.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of March 3, 1883.
Steel hammer-molds, or swaged steel hoops of all gauges and widths ingots and forged ingots pins, crank and wrist piston-rods plate, pressed, sheared, or stamped shapes, or blanks of plates of all thicknesses and widths propeller shafts rods, connecting and piston shaft, steamer, crank, and other shapes, pressed, sheared, or stamped. (See above.) sheet or plate. (See above.) sheets of all gauges and widths slabs, by whatever process made steamer shafts strips of all gauges and widths substitutes. (See Alloys above.) swaged, or hammer-molds tapered bars) in ingots bars coils sheets and steel wire not less than one-fourth of one-inch in diameter valued at seven cents per pound or less valued at above seven cents and not above eleven cents per pound valued at above eleven cents per pound (tools. (See Alloys.) wrist-pins all the above classes of steel n.o.p.f. valued at not over four cents per pound valued above four and not over seven cents per pound valued above seven and not above 10 cents valued above 10 cents per pound (Provided, That on all iron and steel bars, rods, strips, or steel sheets, of whatever shape, and on all or steel bars of irregu- lar shape or section cold-rolled, cold-hammered, or polished in any way in addition to the ordinary process of hot-rolling or hammering, there shall be paid one-fourth cent per pound, in addition to the rates provided in this Act.) (and on steel circular saw plates there shall be paid one cent per pound in addition to the rate provided in this Act.) angles axles, and parts thereof axle-bars blanks forgings for beams, girders, joists, &c., and other structural shapes. (See Iron beams) blacksmith's hammers and sledges boiler-tubes, flues or stays, wrought bolt-blanks bolts, with or without thread or nuts building forms and bulb beams. (See Beams, above.) chain or chains. (See Iron.) corrugated or crimped sheet car-truck channels channels columns, and parts and sections of decks-beams fence wire rods. (See Wire rods below.) cotton ties. (See Iron.) crowbars cutlery, n.o.p.f. files, file-blanks, rasps, and floats of all cuts and kinds— 4 inches in length, and under over 4 inches in length, and under 9 inches 9 inches in length, and under 14 inches	Pound, 2½ cents. Pound, 3 cents. Pound, 3½ cents, & 10 per cent. 45 per cent. Pound, 2 cents. Pound, 2½ cents. Pound, 3½ cents. { Additional per pound, ¼ cent. Additional per pound, 1 cent. Pound, 1½ cents. Pound, 2½ cents. { without reference to the stage of manufacture. } Pound, 1½ cents. Pound, 2½ cents. Pound, 3 cents. { Pound, 2½ cents. Pound, 1½ cents. Pound, 1 4-10 cents. (See Iron beams) Pound, 1½ cents. 35 per cent. Pound, 2½ cents. 35 per cent. 35 per cent. Dozen, 35 cents Dozen, 75 cents. Dozen, \$1.50.	See rates below.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882	Act of March 3, 1883.
Steel files, 14 inches in length and over) not exceeding 10 inches in length exceeding 10 inches in length	Pound, 10 cents, & 30 per cent. Pound, 6 cents, & 30 per cent.	Dozen, \$2.50.
(fish-plates, railway. (See Iron) flat, with longitudinal ribs for the manufacture of fencing floats. (See Iron files.) flues, boiler, wrought forged shot-gun barrels, rough-bored forgings of, for axles, &c. (See Iron) n.o.p.f. (See Iron) for vessels, steam-engines, and locomotives, or parts thereof, weighing each 25 pounds or more girders. (See Iron beams) hammers. (See Blacksmiths, above) hinges, finished, and hinge-blanks hoops for baling purposes. (See Iron cotton ties) joists.) See Iron beams) knitting-needles n.o.p.f.	Pound, 11 cents. Pound, 6-10 cents. Pound, 3 cents. 10 per cent. Pound, 2½ cents. Pound, 2 cents. Pound, 11 cents. Pound, 2½ cents. 35 per cent. Pound, 1½ cents. 25 per cent. 25 per cent.	Pound, 11 cents. Pound, 6-10 cents. Pound, 3 cents. 10 per cent. Pound, 2½ cents. Pound, 2 cents. Pound, 11 cents. Pound, 2½ cents. 35 per cent. Pound, 1½ cents. 25 per cent. 25 per cent.
manufacturer's articles or wares n.o.p.f., wholly or partly of, whether wholly or partly manufactured nails, cut hob, wrought horseshoe, wrought wire wrought, n.o.p.f.) nail-wire rods. (See Wire rods.) (nuts, wrought pens, metallic, (other than gold or silver) pipes or tubes, other wrought) plates, engraved galvanized or coated. (See Iron.) posts and parts or sections of. (See Iron beams.) rails, flat, punched) T, weighing not over 25 pounds to the yard railway-bars, wholly or partly of, weighing over 25 pounds to the yard (fish-plates splice-bars tires, locomotives, car and other, or parts thereof) locomotive tier, or parts thereof (wheels and tires, &c. (See Iron) purposes, sheet-tired wheels for, whether wholly or partly finished) rasps. (See Files, above.) rivet wire rods. (See Wire rods, below.) (rivets. (See Iron) rods, wire. (See Wire rods.) saw plates, circular (see Steel circular saws)— Valued at 4 cents per pound, or less Valued above 4 cents, and not above 7 cents per pound. Valued above 7 cents, and not above 10 cents per pound. Valued above 10 cents per pound saws. (See saws.) screw wire-rods. (See Wire rods, below.) screws, commonly called wood-screws— 2 inches or over in length (1 inch and) less than 2 inches in length (Over ½ inch and less than 1 inch in length ½ inch and less in length) screws of any other metal than iron and all other screws of iron except wood-screws sheet, polished, planished, or etched shoes, horse, mule, and ox sledges, blacksmiths'	45 per cent. Pound, 11 cents. Pound, 4 cents. Pound, 2 cents. Gross, 12 cents. Pound, 21 cents. 25 per cent. Pound, 11 cents. Pound, 8-10 cent. Pound, 1 cent, or 1½ cents. Pound, 1½ cents. Pound, 2½ cents. pound, 3 cents. Pound, 2 cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 1 cent, and 45 per cent. Pound, 3 cents. Pound, 3½ cents. Pound, 4½ cents. Pound, 5-10 cent. Pound, 8 cents. Pound, 11 cents. 35 per cent. Pound, 2½ cents. Pound, 2 cents. Pound, 2½ cents.	45 per cent. Pound, 11 cents. Pound, 4 cents. Pound, 2 cents. Gross, 12 cents. Pound, 21 cents. 25 per cent. Pound, 11 cents. Pound, 8-10 cent. Pound, 1 cent, or 1½ cents. Pound, 1½ cents. Pound, 2½ cents. pound, 3 cents. Pound, 2 cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 2½ cents. Pound, 1 cent, and 45 per cent. Pound, 3 cents. Pound, 3½ cents. Pound, 4½ cents. Pound, 5-10 cent. Pound, 8 cents. Pound, 11 cents. 35 per cent. Pound, 2½ cents. Pound, 2 cents. Pound, 2½ cents.

IV.—COMPARATIVE STATEMENT OF IMPORT DUTIES, &c.—Continued.

[See note on top of page 160 for explanation of text in italics and parentheses.]

ARTICLES ENUMERATED.	Rev. Stat. of June 22, 1874. Acts of February 8, 1875. March 3, 1875. July 1, 1879. June 14, 1880. May 6, 1882. Dec. 23, 1882.	Act of March 3, 1883.
Steel spikes, cut.....		
wrought.....		Pound, 1½ cents.
splice-bars, railway.....		Pound, 2 cents.
sprigs. (See Iron.).....		Pound, 1½ cents.
stays, boiler, wrought.....		
tacks. (See Iron.).....		Pound, 3 cents.
track tools.....		
tubes, boiler, wrought.....		Pound, 2½ cents.
other than boiler, wrought.....		Pound, 3 cents.
washers, wrought.....		Pound, 2½ cents.
wedges).....		Pound, 2 cents.
(wheels, and steel-tired wheels for railway purposes, whether wholly or partly finished, and iron or steel locomotive, car, and other railway tires, or parts thereof, wholly or partly manufactured).....		Pound, 2½ cents.
ingots, cogged ingots, blooms or blanks for the same, without regard to the degree of manufacture).....		Pound, 2½ cents.
wire. (See Wire.).....		Pound, 2 cents.
(wire rods (rivet, screw, nail, and fence), round, in coils and loops, not lighter than No. 5 wire-gauge, valued at 3½ cents or less per pound).....		Pound, 6-10 cent.